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# On the Mountain's Brink

## A Forest Service History of the 1980 Mount St. Helens Volcanic Emergency



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ON THE MOUNTAIN'S BRINK

A Forest Service History  
of the 1980 Mount St. Helens  
Volcanic Emergency

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Have you not heard of them  
that were made to err ...?  
Those that you see lie dashed  
in pieces at the bottom of this  
mountain are they... an  
example to others to take  
heed how they clamber too high,  
or how they come too near  
the brink of this mountain.

-- John Bunyan,  
Pilgrim's Progress



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## PROLOGUE

When Mount St. Helens resumed volcanic activity in March 1980, no person then living had witnessed its last eruption, and most people had only vague or mistaken conceptions of what to expect. Not since the eruptions of California's Lassen Peak between 1914 and 1921 had any locality in the coterminous United States been faced with the consequences of a volcanic emergency, and so the general public had very limited experience against which to gauge the seriousness of what was about to happen. Fortunately, the Mount St. Helens volcano had been the subject of recent investigations into its potential hazards, and substantial scientific understanding of what to expect from an eruption was available. Hints of a possible eruption at Mount Baker in Washington's Northern Cascades four years earlier had also given impetus to contingency planning in the event of a volcanic emergency. But the events that unfolded at Mount St. Helens in 1980 proved to be so unprecedented as to constitute a unique chapter in American natural disasters.

Elsewhere in the world, a number of historic accounts of similar or even larger volcanic catastrophes suggested the enormity such events can assume. Many violently explosive eruptions of the kind seen at Mount St. Helens have been witnessed outside the United States, Mount Pelee's destruction of St. Pierre, Martinique, in 1902, with the nearly instantaneous death of its 30,000 inhabitants, ranks among the most lethal. Possibly the best known of such historic eruptions is that of Vesuvius in A.D. 79, resulting in the destruction of Pompeii and Herculaneum, and owing its fame in part to the archaeological rediscovery of the entombed remains of these cities in the 19th century. An eyewitness account by the Roman writer Pliny the Younger reveals a number of vivid personal details that parallel the experiences of survivors at Mount St. Helens.

Pliny's description of Vesuvius' momentous eruption is contained in two letters written to the historian Tacitus in response to the latter's expressed desire "to hear about the terrors and hazards" of the volcano's rampage. Survivors from the Mount St. Helens devastated area no doubt would recognize something of their own harrowing experiences in Pliny's words:

I looked round: a dense black cloud was coming up behind us, spreading over the earth like a flood. . . We had scarcely sat down to rest when darkness fell, not to the dark of a moonless or cloudy night, but as if the lamp had been put out in a closed room. . . A gleam of light returned, but we took this to be a warning of the approaching flames rather than daylight. However, the flames remained some distance off; then darkness came on once more and ashes began to fall again, this time in heavy showers. . .

At last the darkness thinned and dispersed like smoke or cloud; then there was genuine daylight, and the sun actually shone out, but yellowish as it is during an eclipse. We were terrified to see everything changed, buried deep in ashes like snowdrifts (Radice, p.172).

This stoic Roman concluded by remarking that "these details are not important enough for history. . .; if they seem scarcely worth putting in a letter, you have only yourself to blame for asking for them." Judging by the outpouring of descriptions and photographic material about Mount St. Helens, few persons today would agree with Pliny's self-effacing assessment of his experiences. His remarks may be taken as a reminder that mere fascination with the strange, curious, or macabre is a tempting pitfall for the historian of events such as volcanic catastrophes. But considering its widespread impact on people's lives, industry, business, agencies of government, and the very resources of the land, there is ample broad historic "significance" in the Mount St. Helens eruptions of 1980 to avoid this pitfall. Still, the individual first-hand accounts of small segments of the larger event, or of the detailed experiences of particular agencies involved as the crisis unfolded, will remain the essential ingredients from which a fuller understanding of this extraordinary natural disaster will eventually emerge.

The USDA Forest Service and its personnel, particularly those of the Gifford Pinchot National Forest, were drawn perforce into the vortex of the Mount St. Helens crisis by a simple fact of geography: the mountain is located within the boundaries of the Gifford Pinchot National Forest. In certain respects, however, its location is anything but simple, involving a checkerboard pattern of intermixed Federal, State, and private lands. As a consequence, Forest Service personnel faced not only the uncertainties of an erupting volcano but the need for close intergovernmental and public-private cooperation under exceptionally trying circumstances. While a good deal will no doubt be learned about the processes of volcanism from the Mount St. Helens eruption, equally important lessons concerning crisis management methods also emerge from the record. Since the Forest Service and its personnel were so often at the heart of the decisions and actions taken in response to the crisis, agency documents and the experiences of its people are vital elements of this record.

In the broadest sense, the aim of this work has been to insure that the historical evidence bearing on the Forest Service's role in the Mount St. Helens eruptions of 1980 is preserved intact, and that it be given some preliminary organization and interpretation. If another result is to gain new insights into how volcanic or other large-scale natural disasters might best be responded to, that benefit ought not be neglected. Future researchers no doubt will seek other meaning from the record, and the many individual reactions to events also have a compelling, intrinsic interest aside from any instructive values. Whatever reasons one may have for examining this remarkable episode, the following material should offer a more informed grasp of events, particularly concerning the involvement and contribution of the Forest Service.

## PART I: THE MOUNTAIN SETTING

High atop Burley Mountain, located in the northern part of the Gifford Pinchot National Forest, stand the weather-beaten, long-abandoned remains of a Forest Service lookout built in 1932. From its ash-covered perch, the lookout commands a sweeping view of the surrounding wilderness, which lies devastated only eight miles to the southwest. To the north and southeast loom the serene giants, Mount Rainier and Mount Adams, their glacier-worn summits luminescent in the late afternoon sunlight. To the southwest and barely visible in the rising mists, the shattered form of Mount St. Helens fitfully ejects small clouds of steam.

Although Burley Mountain escaped the main thrust of the violent blast of May 18, 1980, air-borne volcanic ash still coats its standing trees and clings to its vegetation, resisting the efforts of rain and wind to remove it. Still, the forest is recovering. On the steep slopes of Burley Mountain, wild strawberries have triumphed over the grey, gritty mantle, several inches thick; herbs and shrubs sprout now and blossom. Life has begun to stir again even in the bleak zone of devastation. This is neither the first volcanic disaster the forest has witnessed, nor is it likely to be the last.

The Gifford Pinchot National Forest, located in south-central Washington State, covers more than a million and a quarter acres of rich timberland, green river valleys, and precipitous ridges below towering volcanic cones. It is home to a variety of wildlife species. Deer and elk are numerous throughout the forest as well as coyotes, some bear, an occasional cougar, and many smaller animals. The clear, cold, turbulent streams are a fisherman's paradise; campers, alpinists, and backpackers savor the high snowfields, forests, and mountain meadows.

It is a timber-rich land. Stretching southeast from Burley Mountain to the community of Trout Lake, the road winds through a countryside clothed in trees of many coniferous and some deciduous species. The river valleys, at lower elevations, are thick with giant hemlock, cedar and Douglas-fir, as well as alder, maple, and cottonwood. Above 3,000 feet, and up to 5,000 feet, the mountainous terrain is blanketed with Douglas-fir, various species of true fir, and mountain hemlock.

It is a rugged land. Drained by six rivers and their tributaries, the slopes are characteristically steep and the valleys narrow. Waterfalls careen off rock ledges spraying the lush undergrowth. Lacey ferns carpet the lower forest floors, and huckleberry fields abound in the higher elevations. Scattered throughout the forest, jeweled lakes reflect the beauty and variety of the landscape.

Picturesque Spirit Lake, the prize gem of them all prior to the May 18 eruption, attracted thousands of visitors each year. People came there to camp, hike, fish, hunt, ski, and climb St. Helens' snowy cone, so majestically mirrored in its waters. Summer camps, resorts, and vacation homes dotted the shores of the lake. To deal with the large number of people who visited the Spirit Lake Basin the Forest Service

maintained a Visitors Information Center at the lake. Its staff was responsible for answering questions about the surrounding forest, about the lore and history of the lake and its then-graceful mountain guardian towering above the lake's south shore. When the snows were deep in winter and spring, Forest Service personnel turned to shoveling snow from roofs and doubled as avalanche observers.

On March 20, 1980, Chuck Tonn, a Forest Service employee at the Information Center at Spirit Lake, telephoned geologists Donal Mullineaux and Dwight Crandell at the Department of the Interior's Geological Survey field offices in Denver. Tonn had worked in the Spirit Lake area since 1970, and he had met Crandell and Mullneaux in the early 70's when they were surveying the mountain to collect data as part of a study of volcanism in the Cascade Mountains. The results of their work were subsequently published in 1978 in a U.S. Geological Survey Bulletin describing the potential dangers that could be expected from future eruptions of the mountain. Mullineaux and Crandell had cautioned that St. Helens "was probably the volcano most likely to endanger people and property in the Western United States." They had also forecast that the dormant period, which began in 1857, might well end with an eruption before the 20th century was over.

These words echoed in his mind as Tonn picked up the telephone to call the geologists following an earthquake that shook the mountain that Thursday. If the tremor was somehow related to volcanic activity he knew they would want to be notified immediately as they had not yet had the opportunity to monitor a Cascade volcano in action.

#### The Mountain as Geologists Saw It

Much remains to be learned about the volcanism of the several lofty and solitary peaks scattered throughout the length of the Cascade Mountains. This range runs in a north-south line from southern British Columbia, through Washington and Oregon, to northern California, and it is part of a much larger arc of volcanoes sometimes called the "Ring of Fire." Encircling the entire Pacific Ocean it runs from Chile to Alaska, then to Japan, and through the other archipelagoes of coastal east Asia to New Zealand; it includes over 300 active volcanoes.

In recent years, geologists have developed a theory suggesting that volcanic activity is related to movements of immense sections of the earth's crust called "tectonic plates." One of the smaller plates, off the Pacific Northwest coast, named for the semi-legendary 16th century explorer Juan de Fuca, is thought to be sinking beneath the edge of the much larger North American continental plate. As it slowly grinds and churns deep into regions of high temperature, it melts rock into pockets of "magma" that work their way up to the surface along fractures, producing volcanoes.

Geologists believe the Cascade Range was created by uplift about seven million years ago, thus forming the base upon which individual volcanic cones such as St. Helens rest. Compared to its neighbors, St. Helens is a young volcano, most of which was formed within the last thousand years.

Before May 18, 1980, the mountain was often likened to Japan's Fujiyama because of its youthful and unblemished symmetry. Geologists believe it overlies a much older volcanic vent which existed as much as 36,000 years ago. Although this ancestral cone is partially concealed by the new volcano it has left ample evidence of its active life. This includes pumice layers and mudflows, several of which traveled at least 30 miles down the Toutle and Kalama River valleys, as well as blankets of ash stretching for miles beyond the volcano.

The "new" volcano's violent history is betrayed by deposits of cinder ash, pumice, and lava which cover the slopes on all sides of the mountain. On the south side, the lava, cooling first on the outside, left great tunnels which wind their way like rivers towards the mountain. These form extensive caves in the slopes of St. Helens, many of which were explored by visitors in the years before the 1980 eruption.

#### The Mountain Through Native Eyes

In addition to the geologic evidence, the volcano's recent eruptive history is also attested to by legends and traditions of the various Indian tribes which lived in the region. Their stories tell of great mountains engaged in fiery combat, toppling massive rock bridges, burning forests, with the very earth itself being torn asunder. One such story told by the Cowlitz Indians, pits Mount St. Helens and Mount Rainier, the ill-tempered wives of Mount Adams, against one another in an explosive display of jealous rage. Mount Rainier was the unhappy loser, having her head and shoulders ripped away by rocks and fire hurled by the shrewish St. Helens. (Holmes, p.7)

The "Bridge of the Gods" story is perhaps the most famous and interesting of the stories told of St. Helens. In a popular version of the tale a great natural stone bridge spanning the Columbia River harbored a sacred fire watched over by an old woman named Loowit ("Lady of Fire"). Because of Loowit's unending kindness the Great Spirit rewarded her with eternal life and transformed her into a white-clad maiden of breathtaking beauty. Word of Loowit's loveliness spread abroad rapidly and soon two young braves, sons of the Great Spirit, were locked in fiery combat vying for her affections. Hurling hot rocks and fire at one another, the braves burned forests and villages, causing the earth to tremble, thereby collapsing the sacred bridge into the Columbia River Gorge. In the Great Spirit's ensuing wrath he struck down the three lovers and left a great mountain peak where each one fell. The young braves were transformed into the "masculine" Guardians of the Columbia, Mount Adams and Mount Hood, while Loowit became the graceful and symmetrical St. Helens, who to this day carries a bit of the eternal fire in her heart. (Harris, p.169)

Unlike the white men who later came to the region, the Indians did not permanently occupy the area near Mount St. Helens. They visited the cool highlands around the mountain during the summer months to fish, hunt, and gather plants; but they never ventured above timberline, avoiding Spirit Lake altogether. They looked upon the area as the

sacred province of the dead, and the lake was considered the residence of devils cast out from other tribes. To the Cowlitz people, Mount St. Helens was Lawelatia or "Person From Whom Smoke Comes," and she was the source of the ultimate power one could seek in the quest for a guardian spirit or Tamanawash. According to Roy Wilson, chairman of the Cowlitz Tribe, "When a young man wanted a powerful spirit, he would go to Lawelatia, fasting and praying while waiting for his Tamanawash." (Mount St. Helens--The Volcano, p.36)

### Explorers, Traders, and Pioneers

European exploration of the Pacific Northwest began in the late 18th century, which is also when the mountain acquired its most recent name. The English explorer George Vancouver first sighted the mountain on May 19, 1792, while probing south in Puget Sound. But it was not until later in October, while pausing off the mouth of the Columbia River, that his journal tells of bestowing upon the "high round mountain...south of Mount Rainier" the name that would be "in honor of His Britannic Majesty's Ambassador at the Court of Madrid," Allyene Fitzherbert, Baron of St. Helens. (Meany, p.128; Vancouver, II p.399)

Encouraged by the wealth of fur-bearing animals, European penetration of the Pacific Northwest advanced rapidly in the early 19th century. The first white men to occupy the region were pelt-hungry traders and fur trappers, many of whom were employees of the Canadian North West Company, controller of the fur trade until 1821. In that year it merged with the Hudson's Bay Company, which subsequently established headquarters at Fort Vancouver.

The volcano was active intermittently throughout these early days of white settlement, and it is from this period that the earliest recorded accounts of eruptions date. The first such authenticated eyewitness account was written in 1835 by Meredith Gairdner, a physician living at Fort Vancouver. In a letter to colleagues in Scotland, which was later published in the Edinburgh New Philosophical Journal, Gairdner observed:

"We have recently had an eruption of Mount St. Helens, one of the snowy peaks of the marine chain on the north-west coast, about 40 miles to the north of this place [Ft. Vancouver]. There was no earthquake or preliminary noise here: the first thing which excited my notice was a dense haze for two or three days, accompanied with a fall of minute flocculi of ashes, which, on clearing off, disclosed the mountain destitute of its cover of everlasting snow, and furrowed deeply by what through the glass appeared to be lava streams." (Harris, p.176)

St. Helens continued its explosive volcanic activity during the 1840s. The diary of Reverend George Gary records on May 30, 1844, as he was sailing up the Columbia River, that "We have a very distant view of a volcano in action, throwing up clouds of smoke... The falling ashes or soot have been seen and gathered from boards or anything of a smooth surface, say, fifty miles from the crater." (Carey, pp. 76-77)

Accounts of St. Helens' eruptions are found not only in letters and diaries but also in newspaper articles from the period as well as the sketches and paintings of artists such as Paul Kane. The best known of his paintings depicting the mountain in eruption show it at night while a group of Indians watch in awe and amazement from a canoe on the Columbia River.

The first ascent of the mountain is credited to Thomas Dryer, then editor of the Portland Oregonian. The climb took place in 1853, and it was followed by a newspaper article in which Dryer described the crater: "Smoke was continually issuing from its mouth, giving unmistakable evidence that the fire was not extinguished." Periodic bursts of activity continued until 1857, after which the volcano entered a dormant period which was to last until March of 1980. During this time many people followed Dryer's footsteps up the mountain's snow-covered slopes, and as recently as 1928, climbers noted hot spots on the cone and steam venting on the south side.

In 1898, there was widespread alarm about heavy steam venting from the mountain, and again in 1903 when some hikers near timberline were caught in a violent earthquake and "a hailstorm of rocks and dust." In the winter of 1921, Mr. and Mrs. Claude Crum, trapping in the area, reported sudden darkness in the afternoon followed by a "terrific electric storm." Later they found the mountain dark "with a fine powder of cinder dust." (Williams, p.23)

Jim Langden, longtime Forest Service employee at Spirit Lake, who first went there in 1934, remembers:

"We knew that Spirit Lake was shaking every once in awhile. Mount St. Helens would rumble a bit and you could feel a little tremor but nobody ever thought about it. We read in the paper it was the most likely one to go, and you knew [about] the tremors--but nobody gave the slightest thought that this thing that did happen, would happen . . . There always was a hot spot on St. Helens, visible from the city of Portland. When the spring snows started to melt you could always see that little black spot, that warm spot on the rock up there that melted the ice." (Langden interview)

The latter half of the 19th century witnessed little change in the forest around Mount St. Helens. Some people could still remember the eruptions, but it was the rugged, nearly impassable terrain and long winter months of snow and cold that were the real deterrents to most settlers. A few doggedly persistent individuals nonetheless braved the harsh conditions. Ole Peterson, who settled in the late 1800s, became a legend on the mountain, as did Harry Truman in more spectacular fashion later. Both colorful, cantankerous, and totally self-reliant individuals, their lives exemplify the hardiness and flavor of mountain life. Jim Langden, who knew them well, relates numerous anecdotes and insights into the lives of these two men of St. Helens.

The first extensive penetration of the area began at the turn of the century following the discovery of small deposits of copper, gold, and silver just north of Spirit Lake in the Mount Margaret country. The organization of the St. Helens Mining District in 1892, followed up by pressure from miners on Cowlitz County led to the completion of the first road from Castle Rock to Spirit Lake in 1901. By 1911, mining activity proved to be unprofitable, and it came to a virtual halt. Mining claims continued to be filed for many years afterward, but mostly as a guise for persons anxious to gain ownership of the timber--creating more than a few headaches for District Rangers responsible for monitoring their activities. Some of these latter-day miners also figured in a curious episode that would bring Mount St. Helens brief national notoriety in the 1920s.

#### The Apes of St. Helens: Genesis of Bigfoot?

In 1924, miners living at Mount St. Helens reportedly had a terrifying encounter with ape-like creatures, about which Forest Service veterans of that era offer some fascinating background. (Langden and Mullens Interviews) Jim Langden, camp superintendent at Spirit Lake for the Civilian Conservation Corps (CCC) in the early 1930s, well remembers one night in the bunkhouse when Bob Lambert, his camp foreman, told him the story of the miners and the apemen. Lambert was on fire duty at Spirit Lake in 1924 when some young miners who lived on the mountain in a canyon came running into camp to tell them that somebody or something was throwing rocks down the canyon onto their shack. At that time there were some Portland YMCA members in the area and, as Langden says, "Anybody who walks that trail and sees a hole in the ground immediately throws a rock down, so we suspect that maybe they [the hikers] rolled a rock down the canyon." Bob Lambert, supposing the same, said, "Oh, I think maybe some apes threw those down." Lambert was known to refer to his young CCC workers--and often to young people in general--as "apes," in a genial, offhand manner. It obviously did not occur to Lambert, until he saw the reaction of the miners, that they might take his statement literally. In any event, the miners dashed off down to the lake campground and did not return to their shack. This amused Lambert, who thereupon decided "that they should do something about this story." Langden continued:

"So they proceeded to carve a track [to make footprints]; and, as Bob tells me, they [Lambert and a co-worker named Bob Allen] took the Forest Service boat and muffled the oars on it and went down from the ranger station to the campground, which was a quarter mile or thereabouts. [They] got out during the night, put this track on and walked around in the dust around the camp. Well, the next morning when the life started to come awake in the campground, the people saw the tracks and they got excited and they came back to the ranger station and they proceeded to be told that 'I guess the apes didn't like you so they followed you down to Spirit Lake.' Well, that hung on, and the people moved out of the campground, but the story kept on going and Bob and his cohorts . . . Rant Mullens and Bill Allen . . . thought that was doing all right, so why not add just a little bit more fuel to the fire? So, on

Saturday night, they went down and trampled the drywash and maybe up around timberline, too, where tracks showed quite plainly. The next day those were found and then, the first thing you knew, the newspaper boys, including L. H. Gregory, then a cub reporter who later became sports editor of the Oregonian, were up there. Well, then the guys got scared, and they just clammed up and wouldn't say a word." (Langden Interview)

Lambert and his friends refused to discuss or acknowledge anything about apes on the mountain thereafter. And this probably added more mystery to the hints and tales that the incident inspired. Rant Mullens, now 86 years old and retired from his Forest Service and private-lumber work, admits to being the man who split out the alder and carved the first track that was used by Lambert and Allen to make footprints at the campground that night. (Mullens Interview)

The ape story spread like a forest fire. Later on, according to Langdon, the now-legendary Harry Truman added more tracks in strategic places, and "old man Lange . . . made tracks and went up and down the drywash one day with a bearskin over him; and then later on, the Skamania paper made a big push on it for something to write about." (Langden Interview) The Mount St. Helens apes soon gained national attention, and they were on the way to becoming a legend. Much later in his career at Spirit Lake, Langden describes being confronted by a stranger wanting to know where Ape Cave was; he claimed to represent an eastern magazine and planned to seek out the apes in the lava tube on the southwest side of the mountain. The stranger explained: "I'm going to write a story . . . I have a theory that they [the apes] hole up in Ape Cave during the wintertime." Langden continued:

"Well, he went on and on, and I told him my story, and he looked me right square in the eye, and he said, 'Well, Mr. Langden, I'm not going to believe it. . . I got paid \$30,000 to come out here and write a story on this thing and I'm going to write a story.' But he was going up to Ape Cave in the wintertime . . . I couldn't stop him from going, but I said, 'If you don't show up, we're sure not going to come look for you.' And I never did know whether he went or not." (Langden Interview)

The legend of these apes, or Bigfoot as they came to be known in northern California, reached far beyond the St. Helens country, and many individuals and organizations have dedicated themselves to searching for the elusive creatures. The canyon of the miners, which gained fame as Ape Canyon, was engulfed in a mudflow in 1980, but its contours are still visible. Rant Mullens claims that the ape story spread to California by means of a friend who stole the original alder feet he carved.

### The Forest Service in St. Helens Country

The National Forest surrounding Mount St. Helens was originally brought under management in 1897 as part of the Mount Rainier National Reserve, which included all unappropriated land between Snoqualmie Pass and the Columbia River. The Rainier Forest was dissolved in 1933 and those parts now known as the Randle and Packwood Ranger Districts were included in the Columbia National Forest, renamed in 1949 for the founder of the United States Forest Service, Gifford Pinchot. (Jermann and Mason, p.4)

Foresters in the early years, directed most of their attention to developing a system of trails to aid fire crews in reaching fires. The first formal trail was established in the early 1900s, between Trout Lake and Spirit Lake, but the vast majority were not built until the 1930's when groups of youths, members of the Civilian Conservation Corps (CCC), started building fire trails, as well as roads, bridges, campgrounds and lookouts, such as the one on Burley Mountain.

Both recreational activities and development of the Spirit Lake basin increased as access into the area was improved. The Spirit Lake and Toutle Ranger Stations were both built in 1910, but the District headquarters was moved to the lake in 1913. In the summer of 1917, a Forest Service lookout was built on the very summit of Mount St. Helen's only to be later boarded up due to poor visibility. The lake became the home of several youth camps, beginning with the Portland YMCA, which received a special use permit in 1911 for a campsite at the south end of the lake. This was followed by several private resorts, in addition to public campgrounds that were built in the 1930s.

Forest Service personnel in the early 1930s were the last to know this wilderness in its primeval splendor. Then, only a few primitive, barely passable roads existed, and the trails were scarce and rugged. There was only one recognizable road to Spirit Lake in 1934 when Jim Langden, then a Forest Service landscape-architect foreman, first arrived. It was the old county road built in 1901. He remembers it as only "a road of sorts, very rough, and if you got [to Spirit Lake], you were lucky." (Langden Interview) On his first trip into the lake, Langden came up to Studebaker Creek--about five miles below the lake--where he crossed the Toutle River, continuing on the old road on the south side of the river, to a point where he and his companions crossed the "drywash"--glacial wash from Mount St. Helens. In those days it was quite an adventure, and as Langden recalled:

"If the mountain was melting, with the rain and snow going, you just didn't get in or out, but waited for the water to go down so you could ford the drywash. If you wanted to go out to town to buy groceries, you checked first to see what the drywash was doing to find out whether you could get out or not. It was dry at times and it was a raging torrent at other times, just depending on the ice-melting conditions on the glaciers on St. Helens." (Langden Interview)

Forest Service personnel learned to know the wilderness intimately on foot, locating trails and camp sites, travelling the District for fire protection and other work. "The principal things in those days were to open up the trails for the purposes of fire crews, to extend communications by stringing telephone wires, and you wanted to keep the trails to the lookouts open so fires could be located. There was no radio or aerial detection in those days." (Langden Interview)

The number of visitors to the Spirit Lake area began increasing markedly in the late 1930s. In 1938, 26,000 visitors were recorded, with over 2,000 of them coming on a single weekend. To deal with the influx, a new road was opened from Castle Rock to the lake in 1939, although it remained unpaved until 1946.

In the early days, loggers had only a small impact on the Forest, with most of their activity confined to selective cuts on its periphery. As the national demand for wood products grew, however, so did pressures on the Forest Service to increase cutting. This pressure was further intensified when local counties such as Skamania--in which nearly all of Mount St. Helens is located--became reliant, in part, on revenues from Forest Service lands. Counties are compensated for their inability to collect property taxes on public land by a share of the revenues from Forest Service timber sales. This picture is further complicated by the intermixed pattern of land ownership around the mountain, even within National Forest boundaries. Large sections of land held by Weyerhaeuser, Burlington-Northern, and Champion International have been extensively clearcut, and many miles of logging roads have been built by these private companies, as well as the Forest Service.

The Gifford Pinchot is a multiple use Forest, although not surprisingly timber production and harvesting are a major emphasis of the Forest's management. The Forest today is headquartered in Vancouver, Washington, being divided into five districts: Mt. Adams, Packwood, Randle, Wind River, and St. Helens. These districts are administered from ranger stations located respectively in the towns of Trout Lake, Packwood, Randle, Carson, and--until March 27, 1980--a place called Pine Creek.

As the winter of 1979-80 drew to a close, the people of this tranquil mountain setting were eagerly looking forward to getting back into the high country. No one expected it would be much different than any other spring. The loggers had their jobs; tree-planting crews would soon be out taking advantage of the springtime warmth and moisture; climbers and hikers hoped for a good season; even the skiers and snowmobilers could look forward to a few more weeks of fun because the heavy snows had come late in the season. In their wildest imaginings few could have then foreseen how drastically this peaceful and contented scene would change before the cycle of spring's renewal could be completed.

## PART II: THE IMPENDING CRISIS

### First Stirrings of the Mountain

Nothing seemed particularly unusual about an earthquake reported in the Longview, Washington, Daily News, Friday, March 21, 1980. A terse Associated Press wire service report out of Golden, Colorado, indicated that the National Earthquake Information Service, U.S. Geological Survey, (USGS) had recorded a tremor registering 4.1 magnitude on the Richter scale at 3:48 p.m. the previous day. Its location was placed near Mount St. Helens in Southwestern Washington. According to USGS spokesman Don Finley "there were no reports of damage or injury."

As events would prove, it was too soon to tell what the consequences of this seemingly minor seismic event would be; but no one had any immediate reason to suppose that it differed much from other earthquakes in the 4-to-5 magnitude range that normally occur every year in the earth's crust. According to a 1974 USGS Earthquake Information Bulletin, over 6,000 quakes in this range could be expected in any given year throughout the world. (Sept.-Oct. Issue, p.24) The Daily News wire service report did call attention to Mount St. Helens' volcanic nature, without suggesting any connection it might have with the seismic activity.

News of this earth tremor reached Forest Service officials almost immediately after its occurrence, when St. Helens District Ranger, Ken Johnson, received word by radio from Sharon Buchard, a Forest District employee volunteer at Spirit Lake, that she had felt a sharp jolt. (Tonn Interview) There was no particular reason for alarm in the knowledge that something seismic had happened near the volcanic cone looming twelve miles to the northeast of Johnson's post near Pine Creek at the east end of Swift Reservoir. But the potential that earthquakes had for triggering avalanches on Mount St. Helens' sheer slopes, buried in heavy spring snows, was real enough to alert the District Ranger so that skiers, snowmobilers or climbers could be warned of any hazards this might pose for backcountry travel. The memory was still fresh of five climbers who had died under a 1976 avalanche on the mountain's north side.

Jim Unterwegner, Public Information Officer at the Gifford Pinchot National Forest headquarters in Vancouver, Washington, 40 miles to the southwest, got word of the Thursday quake from the District Ranger, with no special indication of what it might portend. Friday, March 21, Unterwegner recalls, was a day of suspense, waiting and wondering if more quakes would follow; and when none did, he left for the weekend with only casual thoughts about what might be stirring beneath the rugged forest-clad mountains stretching out to the northeast of his Vancouver office. (Unterwegner Interview No. 2)

Almost exactly 48 hours after the first tremor was recorded, a second and larger (4.3 Richter scale) jolt rolled across the Mount St. Helens countryside at 3:30 p.m., Saturday, March 22. And on Sunday morning, Steve Malone, seismologist at the University of Washington Geophysics Center in Seattle, called Johnson about a 3.75 magnitude quake that had occurred at 8:00 a.m. Ranger Johnson now picked up the telephone to call Roland Emetaz, Recreation Specialist with the Forest Service's Region 6 Office in Portland, whose responsibilities included the assessment of avalanche hazards.

Mount St. Helens held a particular fascination for Roland Emetaz, for he knew its glaciers, snowfields, rocky outcrops, and the lethal avalanches that could sweep its flanks with an intimacy gained from years of experience on the mountain. A member of the Mazamas, a Portland-based mountaineering club, he had made at least 30 ascents to the broad expanse at the mountain's summit. He was well acquainted with what could happen if one of these quakes were to shake loose tons of snow, for he had helped rescue the survivors of the 1976 avalanche tragedy.

Emetaz was reached at his Vancouver home that Sunday morning at 10:15, and Johnson explained his concerns. Not much could be concluded merely on the strength of this telephone conversation, so Emetaz decided to go to Spirit Lake to find out what he could first hand.

It was snowing lightly when he arrived at Spirit Lake, and the mountain was shrouded in fog, so he was unable to make any visual observations. He talked with Chuck Tonn, Recreation Assistant for the District, and Sharon Buchard, who was stationed at the Visitor Center as an avalanche observer, tentatively concluding that conditions were probably not as hazardous as supposed. "I just wasn't really too concerned," he recalled later. "We'd had earthquakes before... I figured that the earthquakes probably had already released the most unstable snow..." (Emetaz Interview)

Emetaz returned to Vancouver unconvinced that the avalanche situation on Mount St. Helens warranted much concern. But he still had not seen the condition of the snow slopes themselves, so on Monday morning, March 24, he made arrangements with Ed Osmond, Recreation and Lands Staff Officer on the Gifford Pinchot National Forest, to view the mountain from the air. They flew out of Pearson Airpark in Vancouver, hoping for a break in the clouds to verify actual conditions. On the north and east sides of the mountain, Emetaz saw exactly what he had expected: "The normal avalanche pass had released... The avalanches had gone down the normal tracks... The runout zone on the Plains of Abraham was filled with avalanches..." Everything was just as he thought, except that as they were completing their flight around the mountain they noticed, in Emetaz' words, "a pretty good size slab avalanche... in a spot that normally we didn't see avalanches..." (Emetaz Interview)

At the time, it was difficult to assess the significance of this peculiar and unexpected discovery because it was in an area where avalanche observations were seldom made. There was not enough evidence in this one sighting to change Emetaz' mind about the degree of risk, but it was still a little puzzling. Neither he nor Osmond could then know that they had witnessed the first outward signs that something unusual was building within Mount St. Helens' hitherto placid cone.

While Emetaz was checking on the avalanche situation, Johnson began telephone discussions with Bob Tokarczyk, Gifford Pinchot National Forest Supervisor, and Frank Kopecky, Acting Regional Forester, Region 6, about the possibility of closing the mountain to the public. No immediate determination was made pending more information from the USGS, but Monday morning's events did nothing to alleviate Johnson's concerns. Steve Malone

and his USGS colleague, Craig Weaver, were now reporting "swarms" of quakes; Johnson recorded in his notes that one of the seismologists remarked, "there's an even chance that something interesting will occur... a classic sequence of events leading to an eruption..." And on Monday at 2:00 p.m., the largest quake yet (4.4 magnitude) rocked the mountain, which was enough for Jerry Gause, Public Information Director for the Forest Service's Region 6 Office, to put in a call to National Geographic Assistant Editor Rowe Findley suggesting that something important might be in the making. By Tuesday, March 25, so much seismic activity was being reported by the Geophysics Center in Seattle that it was becoming difficult to keep track of the exact number and magnitude of individual quakes. There was now a growing realization among Forest Service personnel that this was no ordinary series of tremors.

The events of the weekend began to surface publicly when the readings of the University of Washington/USGS seismographs and Ranger Johnson's concerns were reported by the Longview Daily News in a March 24 article by Donna du Beth. The possibility of some connection between this curious seismic spell and the revival of volcanic activity was also explored briefly in this article, which drew some of its information from the 1978 USGS publication by Dwight "Rocky" Crandell and Donal Mullineaux on the volcanic hazards of Mount St. Helens. One Toutle River resident at Kid Valley, the article mentioned, scoffed at this talk of tremors, reportedly attributing it instead to someone wanting "to stop development."

Many other persons in varying ways--not the least of whom was Harry Truman of Spirit Lake--would similarly resist grasping the reality of the mountain's ominous hazards and vast destructive capabilities. Such attitudes prevailed for some right up to the moment of truth on May 18, and this would soon come to plague officials in the Forest Service and other agencies with public safety responsibilities.

As news of the swarms of quakes on Monday and Tuesday reached the media, accounts were flashed over the UPI and AP wire services. An order closing the mountain to recreationists above timberline was also signed by Forest Supervisor Tokarczyk on Tuesday, March 25, which further alerted the public to what would be described in a Wednesday avalanche advisory as "dangers associated with a series of earthquakes." (Forest Service Teletype Advisory, March 26, 1980) Jim Unterwegner recalls that "on Wednesday it kind of calmed down...", but the next day his normal public information routine would cease abruptly "somewhere around 12:30 or quarter to one in the afternoon" when "...we heard some rumors that an eruption was taking place on the mountain." (Unterwegner Interview No. 1)

For Ken Johnson, at the St. Helens Ranger Station, all doubt as to the meaning of the events of the last several days was erased, when, as he described it,

"...just after lunch [March 27] we heard the sonic boom--we thought--and I was sitting at the front desk, there on the telephone in our office, when the back door flew open at a quarter 'til--or 10 minutes to--one, and Dave Seesholtz and Keith Christensen came through the back door wide-eyed and excited. They had just heard the report over the radio that the mountain had erupted." (Johnson Interview)

The source of this information had been a report at 12:48 p.m. from a private aircraft flying a Portland news crew over the mountain. (Forest Service Teletype Situation Report, March 27, 1980) And so, what had begun for Ken Johnson as a minor seismic report had now escalated, within a week, from an uneasy concern for avalanche hazards to a volcanic emergency the dimensions of which would stagger the imagination before two months were out.

### Organizing the Forest Service Response

Closing the mountain above timberline on March 25 was the first official Forest Service act in response to the volcano's seismic stirrings. It was a precautionary measure taken before anyone could be certain about what would come next or even whether the main threat was from avalanching snow or the imminence of a volcanic outburst.

Until the eruption of March 27, the idea that Mount St. Helens might turn violent was something tinged with a certain unreality. Ranger Johnson remembers: "I think the mood of a number of employees and their families [was]: It's a joke--there wasn't anything going to happen." But, for a small core of Forest Service officials at the Gifford Pinchot headquarters in Vancouver, there would be no ignoring the mountain's apparent warnings. Ed Osmond, who had accompanied Emetaz on Sunday's aerial survey of avalanche conditions, recalls: "We were thinking that something really serious could happen...to the degree that on the 25th [Tuesday]...after talking to the Forest Supervisor [Tokarczyk], Deputy Supervisors [Duane Tucker], and Ranger [Johnson], I generated the meeting which was the precursor meeting...to bring all the agencies together." (Osmond Interview)

There were at least twenty individuals representing a dozen public agencies or private organizations on Osmond's list to call: the Sheriffs of Skamania and Cowlitz Counties; the Washington State Patrol, Department of Transportation, Emergency Services, and Department of Natural Resources; Weyerhaeuser and Burlington- Northern, both major private landowners in the mountain's vicinity; Pacific Power and Light, operator of a reservoir complex on the Lewis River; the U.S. Geological Survey; the University of Washington Geophysics Center; and various Forest Service representatives. The meeting was convened by Supervisor Tokarczyk at the Forest headquarters in Vancouver, 9 a.m., Wednesday, March 26, with between 30 to 35 persons in attendance.

Television, radio, and newspaper reporters signed in, along with county commissioners from Skamania and Klickitat Counties, representatives of Clark County and the Yacolt Fire District, the U.S. Army Corps of Engineers, as well as the people from Osmond's original list of contacts. Expectancy ran high.

Donal Mullineaux, co-author of the USGS publication on Mount St. Helens' volcanic hazards, had arrived from Colorado, and he now ran through the volcano's 4500-year record of spasmodic violence. Many in the audience would get their first taste of the strange-sounding geologic terms that would later be used by the non-scientists with abandon. Mullineaux mentioned such things as pyroclastic flows, harmonic tremor, dacite domes, tephra eruptions, and mudflows, with only an occasional word about the

molten lava flows that volcanoes popularly bring to mind. Anyone in doubt or uninformed as to the dangerously explosive potential of Mount St. Helens should have been quickly set right by the descriptions given of the volcanic phenomena that typified its past activity. Still, the question probably uppermost in everyone's mind was whether these seemingly far-fetched scenarios of destruction were really about to happen. And, if so, what ought to be done?

Listening to Mullineaux's articulate description, Osmond realized that "it could really happen." No one was left in doubt as to past geologic events: "We're serious about this!"

As to the measures to be taken, the meeting's participants agreed that the Gifford Pinchot National Forest organization was in the best position to perform the "facilitator" role in whatever steps might eventually be necessary. The Forest Service had logistical, aerial surveillance, and ground-to-air communication capabilities already in place. These advantages, combined with the Forest Service's fire-fighting experience and pre-existing arrangements with County Sheriffs on search and rescue operations, argued convincingly for this consensus.

There were some entirely new wrinkles to be worked out, particularly in the event of large-scale closures, because not all highways, roads, or lands potentially involved were under Forest Service jurisdiction. The very summit of Mount St. Helens, for example, was owned by Burlington-Northern. No legislation existed at any level of government defining responsibilities in a volcanic emergency, so some type of interagency contingency plan was needed to provide a framework for coordination. The meeting concluded with agreement that the Forest Service should draw up such a document, guided in concept by four principles:

1. The focal location would be at the Gifford Pinchot National Forest headquarters in Vancouver.
2. High priority would be given to developing a communications network.
3. Representatives from all key agencies would be assembled at the Vancouver center to form a core group, once an eruption started.
4. The core group and its operational facilities in Vancouver would be called the Emergency Coordinating Center (ECC).

The task of drafting the contingency plan fell to Ed Osmond, who had 24 years of experience with the Forest Service. He had been assigned to the Gifford Pinchot National Forest barely two months earlier, having completed an eight-year stint as a District Ranger on the Deschutes National Forest in Central Oregon. Trained as a forester, his new assignment on the Gifford Pinchot National Forest was as Recreation and Lands Staff Officer, with responsibilities that included land acquisition and exchange, law enforcement, and cultural resources. He was a newcomer to Mount St. Helens, but it would quickly become an intimate and all-consuming acquaintance.

"About the 23rd [of March]," Osmond recalls, "I had contacted the [Mount] Baker-Snoqualmie [National Forest] because they...[had previously] had some heating and generation that looked like they were going to get into activity." By thus anticipating his now urgent assignment, he already had some clues to go on from the contingency planning done at Mount Baker. (Osmond Interview)

Arriving at his Vancouver office at six o'clock Thursday morning, Osmond began sorting out the previous day's discussion. "It was a great moment...," he remembers, reflecting on his feelings at the time. "I was setting down all that morning working over in my mind the types of things that would go into the contingency plan: the roles, the communications, the key players, the ring-down phone systems that we would need... It was all going through my mind..." He worked through the usual 11:45 a.m. lunch break because of the urgency. Then, as the noon hour approached, Osmond recalls vividly what happened: "I was writing my first paragraph of the contingency plan when the mountain blew." (Osmond Interview)

Twelve days elapsed before Osmond would finish writing the Mount St. Helens Contingency plan, for he was drawn immediately into activating the Emergency Coordinating Center (ECC) envisioned in the previous day's meeting. The various agency representatives had to be notified, arrangements made for desks and telephones, evacuation procedures initiated and closure decisions made. Writing it all down would have to wait. Osmond later described the scene:

"You have to envision the atmosphere...I don't want to say chaotic, but it was near that. It was organized confusion at best... We were...running to meeting after meeting to logically deal with traffic controls, access, who had what authorities, who had what responsibilities,...what type of communications we would need to set up... The plumes...would likely cut off radio communications, thus we knew it would be bad for radios... We had all this...to sort through, plus who does what, and no real rules all pre-worked out except the concept. So this came together by working with this group, then coming back and grabbing 15 or 20 minutes, and then getting thrust into another group... As this developed we were getting into the actual 'doing' job." (Osmond Interview)

The similarity of a volcanic emergency to a large forest fire was perceived from the first, and Supervisor Tokarczyk now brought into the ECC two men whose fire-fighting experience uniquely qualified them for roles in the present situation. Paul Stenkamp, a 37-year veteran with the Forest Service, was called back from the Region 6 Office, where he was on assignment as Assistant Director for Fire Suppression and Aviation. George Theisen, who had 21 years of Forest Service experience, was Acting Fire Staff for the Gifford Pinchot National Forest in Stenkamp's absence, and he too would now be called into serve the ECC in a key role.

Tokarczyk reached Stenkamp in Portland shortly after noon, asking him to take on the "coordination job in the fire room"--as Stenkamp would later explain it. In Osmond's contingency plan draft, the job would be cast in less unassuming terms; there, its responsibility was stated "to provide command leadership and direction to the overall emergency effort" (Contingency

Plan, April 8, 1980, p.7). Stenkamp described his recollection of that Thursday: "I came [to Vancouver] and I recall it took me 20 minutes to get there, which was the quickest trip I'd ever made from Portland... I worked the remainder of that afternoon with Ed Osmond and George Theisen--the group--to coordinate what we'd have to do. At 6 o'clock, I became the Director." (Stenkamp Interview) George Theisen had been attending a meeting of fire management officers in Kelso when he was reached by the Forest Supervisor. Somehow Theisen had not heard about the earthquakes on the mountain until he was asked about them at the Kelso meeting, so the news of an eruption came as quite a surprise. He now realized why Osmond had been asking him for all those telephone numbers. And, flashing back ten years to when he had talked with Mullineaux and others involved in the geologic hazard surveys on the mountain, Theisen now knew: "Those people were right!" He was asked by Tokarczyk to assume the job of Assistant ECC Director, and for 51 days, until the eve of the great May 18 eruption, he would work with no days off, primarily managing the night shifts. (Theisen Interview)

Within two weeks of its inception, the ECC was functioning essentially as Osmond, Stenkamp, and Theisen had originally envisioned it. Theisen observed later: "We set it up similar to a fire campaign... The tactics...were completely unfamiliar to us, but as far as the organization, I don't think we had too much trouble organizing at all." (Theisen Interview) A few additional participants were added to the original ECC membership, such as Portland General Electric (because of concerns about its Trojan Nuclear Plant), and the Federal Aviation Administration (because of air traffic concerns); but the basic system was in place by April 8 when Osmond submitted the draft contingency plan for circulation.

The organizing phase was thus over quickly, partly because the swift pace of events on the mountain simply compelled it. But also, by having many of the needed capabilities in place and personnel who grasped the importance of decisive and coordinated action, the Forest Service was able to fashion an effective response organization in the brief time available. There would be many things to learn about the tactical aspects of this volcanic emergency, but the vital structure for command decisions and coordination came into being with few delays.

#### The Pine Creek Evacuation

The fire siren at the St. Helens Ranger Station near Pine Creek began wailing at about 1:30 p.m., March 27. Just moments earlier, the first emergency evacuation order had been issued from the ECC, when, as Ranger Johnson recalls, "Ed Osmond called me and told me to 'get the hell out of there.'"

Evacuation procedures had actually begun earlier in the week, on March 25, when Chuck Tonn and Sharon Buchard were ordered by the District office to end their vigil at the Spirit Lake Visitor Center. Tonn later described the scene on the north side as they cleared out, posting closure signs as they went:

Tuesday [March 25] we wanted out of there because it was getting pretty scary. I remember the University of Washington came up to change the tape on the portable seismograph--we were having some pretty bad ones... It was real interesting that the live trees didn't sway very much, but the snags would just sway--you could see them. Then [one of the seismologists] was saying: "This is not a good place to be." So at that time...we wanted to leave and [the seismologists] kept saying they wanted to wait five minutes longer, and I said I didn't want to wait five minutes longer... because we were putting up some signs indicating the area was closed... trying to put them up at the last minute." (Tonn Interview)

The evacuation of the Ranger Station itself, on the mountain's southeast side, would be conducted two days later in a more urgent atmosphere, because by then there was no doubt as to the volcano's eruptive intentions. Dave Seesholtz (who was Trnn's supervisor) had been asked by Ranger Johnson to draft an emergency evacuation plan. Unlike other such plans he had worked on, this one would be destined for almost instantaneous implementation. Thursday morning, District employees and residents of the nearby Northwoods Summer Homes Association were assembled and briefed on its contents, little realizing they would be moving out within hours on the planned evacuation route past Eagle Cliff towards the Wind River Ranger Station some 25 miles to the southeast.

Seesholtz had carefully selected the evacuation route to avoid the usual way in and out of the Pine Creek location. The normal access route lay to the west, following State Highway 503 and Forest Service Road N90, and it passed through zones which the Crandell-Mullineaux studies had shown to be among the riskiest on the south side. The Swift Creek drainage, in particular, had persistently been the scene of mudflows, lava and pyroclastic flows, and floods pouring down the volcano's southern flanks. The evacuation route sensibly avoided this area.

Kathy Anderson was one of the District employees who attended the morning briefing. She had worked on District reforestation projects since 1976, enjoying the tranquility of life in the mountains. Events in the wake of the briefing would abruptly change all that. Recalling the excitement of preparing to leave, she later described her experience:

"I had some bags packed at home and when I ran home, I kept looking out the door and could see that not all the neighbors had their cars [ready] yet either. So I kept thinking of another thing to grab... what I ended up grabbing was... the rifle and French shotgun that I had, because I figured, well... what if we get stranded? I'd at least be able to shoot something to eat... From the talk of what could happen at the mountain, I thought: What if trees blow down? So I grabbed the chainsaw... Then I thought... with all this activity... I better take some beer... I threw these three things in the truck... jumped in and raced back up to the Station." (Anderson Interview)

With the fire siren now stilled because it only added to the confusion, she recalls gathering up her key working files at the Ranger Station and proceeding down the road across the Eagle Cliff Bridge. Once across, she remembers, "We all felt like we were on the safe side of the river now, because we'd crossed the head of the river..." She was there about 10 or 15 minutes as other vehicles joined the convoy, and then they all headed up the road toward the Wind River Ranger Station.

As District Ranger, Ken Johnson had overall responsibility for assuring the safe departure of everyone from Pine Creek. He remembers the evacuation as it began:

"We flipped the switch on the siren and made the announcement over the radio... to evacuate... In less than 30 minutes, we were all across Eagle Cliff Bridge departing to the southeast... We spent a considerable amount of time notifying and helping some people at Northwoods [summer homes] to evacuate. The deputy sheriff--Skamania County Deputy Sheriff--assisted in that. He came along after the word went out... Sometime around two o'clock I issued an order--a verbal order--closing the N90 [road] down on the west end..." (Johnson Interview)

Once the convoy of evacuees reached the Wind River Ranger Station, Ranger Johnson informed the Supervisor's Office in Vancouver of their safe arrival. They would all meet briefly to talk about their newly attained status as volcanic refugees over refreshments provided by the Wind River District staff. There was an immediate need to arrange places to stay overnight for the persons who lived at Pine Creek. "The wives of some of us," Johnson recalls, "had already gotten together and were working on that while we were evacuating." Other Forest Service employees were sent home for the night with instructions as to where to report next morning. (Johnson Interview)

The evening of March 27 was spent by Johnson at the Supervisor's Office in Vancouver, collecting information and figuring out a course of action for the next day. He called his principal assistants that night to set up a meeting next morning at the Forest Service compound at Chelatchie Prairie, located about 20 miles southwest of the ash-covered summit that was now the focus of so much attention.

In the morning, Johnson convened the meeting at Chelatchie where it was quickly decided to go back to Pine Creek that morning to retrieve additional office materials and personal effects. He recalls: "After we got back from that--that was Friday--everybody was dismissed for the weekend." But for Johnson and the residents cut off from their homes at Pine Creek, the weekend would be anything but relaxed. After meetings on Sunday with them and the Supervisor's staff and considering the USGS's hazard assessment, Johnson recommended that the Pine Creek location be evacuated permanently, meaning that everything moveable-furniture, office equipment, files, personal effects of every sort--would have to be transported out.

Tuesday, April 1, was initially set as the date for the move. As would so often happen, however, the weather intervened with heavy overcast obscuring the volcano, and the move was put off for a day. Johnson later recounted what happened:

"...On the second [of April], then, they went in and loaded up the 21 households in moving vans and all the office equipment, supplies, desks, furniture--everything... We had two moving companies that furnished us 17 moving vans and trucks... I forget the exact time frame now, but [it was] something like less than seven hours from the time they arrived until we left... We got out; then came the what-do-we-do? syndrome." (Johnson Interview)

For the next several days the District operated out of the Chelatchie compound, while various relocation options were explored. They looked into renting office space to the south another ten miles in Battleground and to the west in Woodland at the mouth of the Lewis River. Remaining at the Chelatchie location was considered; but a decision was finally reached to move to Cougar, a small settlement at the head of Yale Lake.

Ironically, Cougar was actually about a mile closer to Mount St. Helens' summit than Pine Creek. But the town's site was not mapped in a hazard zone in the Crandell-Mullenax study, and, as Ranger Johnson later explained, there were other reasons favoring this decision:

"We finally decided on leasing office trailers and putting them at Cougar. One of the reasons...is that we had a contract with a party [that] was to build an office for us at Cougar and then lease it to us on a regular basis. And that was ongoing. He was at that point in time trying to finalize or secure his financing to complete the job. And the location in Cougar was just across the street from... where the office was being built. So we said: that's the place we ought to be. We're going to be there eventually, [so] we might as well be there, and it will entail a lesser move whenever we do move into the office."

(Johnson Interview)

In the days and weeks after the March 27 evacuation, activities on the St. Helens District settled back into a semblance of normality. The tree planting projects that Kathy Anderson had been working on would be back in operation out of the trailer offices in Cougar by Monday, April 7. "We developed a number of safety precautions and requirements for anyone going up to do work," Johnson recalls, but the normal spring plantings proceeded. "Everybody had a roof over their head," he also remembers. "It was not too certain or definite... but everybody was taken care of, maybe not to their total liking, but they did have... housing." (Johnson Interview)

An uneasy truce with the mountain would thus prevail as the District's employees adjusted to having an active volcano in their midst. The high excitement of the Pine Creek evacuation gave way to dark concerns about what it might all mean for their jobs and future. Still, life went on.

Running the ECC: Prelude to May 18

The name Emergency Coordinating Center had quickly emerged for the core group that was to have responsibility for the decisions and flow of information as events unfolded. It was usually called simply the ECC, and it came into being on March 27 in two rooms on the second floor of the Forest headquarters building in Vancouver. This vital nerve center initially occupied a Fire Dispatch Office and an adjacent conference room equipped with telephone jacks that had been intended to handle large forest fire situations. Later circumstances would compel a relocation of the public information arm.

With each new report of a volcanic outburst, the appetite for more information by the general public--and most particularly the news media--grew rapidly, often fed as much by rumor as fact. It would be the job of Jim Unterwegner, Public Information Officer for the Gifford Pinchot National Forest, acting on behalf of the ECC, to see that in this heady quest for volcano news stories, fact prevailed over fiction. He later described how the sometimes volatile and always sensitive task of disseminating information was approached:

"The basic philosophy we tried to go with at the very beginning was: Let's tell them whatever we can...and let's be right up front...don't try to hide anything... For example, the people in our dispatch room were monitoring the radios--we had observer planes flying around [the mountain] all the time--when we had the plane flying, anytime they radioed in an event...we would be copying that down on a radio log, by hand, and then we would make copies...and hand them out at news briefings or have them available on the bulletin board...usually we had a geologist...to make sure that there wouldn't be something in there that could be misunderstood and create a furor." (Unterwegner Interview No 2)

Regular news briefings were initiated immediately after the eruptions began on March 27. In the beginning, they were held in a large first-floor conference room at the Forest headquarters building, where the back drop of a diagonally-patterned, wood-paneled wall would become, for a time, a familiar sight to television viewers across the country. They were attended by a flood of reporters representing news media from as far away, at the onset, as the Miami Herald--and eventually, world-wide.

No pay telephones were available in the building, resulting almost instantly in the first of several media-related difficulties. The Forest Service telephone system--and budget--had never been intended to service the sizable news corps that was now assembled and trying to call its stories out coast to coast. "The telephone company," Unterwegner thankfully remembers, "came in and...--right in the parking lot out in front of our building--put in two little trailers that had telephones in them for the news media to use." (Unterwegner Interview No. 2) While this quickly cleared up part of the problems, there would be others less easily dealt with.

Besides Unterwegner, eight Public Information Officers--PIO's, in alphabetic shorthand--were assigned to staff the ECC's public information arm. The operation grew like a whirlwind, threatening to swamp the Forest's normal office routine. Unterwegner later described what it was like:

"We had to have people here running information back and forth because we couldn't even get on our own telephone system...half the time...[Barbara Johnson and Charlotte Martin, Information Receptionists] on the front desk, [were] being bombarded with telephone calls... We had to just pick people out...and put them to...typing for updates...we had updates coming in by the minute..." (Unterwegner Interview No. 2)

As the first week in April neared a close, something had to be done to relieve the uproar in the Forest Office. Continuing his recollection, Unterwegner explained:

"It became such an impact on this office that we had to move out...it was disturbing everything... We looked for another place... There wasn't anything readily available, so we went...to the downtown Shilo Motel and rented their conference room. Adjacent to that [were]...two rooms, kind of separated by a folding door. We took the two little rooms...and put our information people in them." (Unterwegner Interview No. 2)

The move to the Shilo Motel was accomplished on Friday, April 4. But no sooner had these arrangements been made, and the information staff settled into its separate location, than the mountain confounded everybody by beginning a gradual slowdown in activity. In the third week of April, explosive eruptions ceased, with a parallel subsidence in the clamor for information. "It kept slowing down...", Unterwegner recalled, "until we got back to the point where we did away with our news conferences completely. All I had in my office was a recording telephone that I could put a message on." (Unterwegner Interview No. 2) This arrangement would suffice until the morning of May 18th, when, as he was about to do the Sunday update, the mountain shattered this and many other quiet routines.

In the days immediately following the first eruptions, Unterwegner ruefully recalls that some of their worst problems arose when the news media, accustomed to eyewitness reporting, tried to gain access to the mountain in the face of closure orders and aerial restrictions. "After the 18th...they still wanted to get [in] but I think they understood the problem a little bit better," he recounted later. "And I'm not too sure that they were as excited about getting into the area...just because of the tremendous amount of damage that was done..." (Unterwegner Interview)

For Paul Stenkamp and George Theisen, who directed operations in the Fire Dispatch Office, running the ECC was a headlong rush grappling with closure and evacuation decisions, sorting out reliable information from rumor, coordinating aerial surveillance efforts, and managing the logistics of an operation for which no tactical manual existed. In the

conference room next to the Fire Dispatch Office, USGS geologists Dwight "Rocky" Crandell, Don Mullineaux, Bob Christensen, Dan Miller, David Johnston and their colleagues pondered what moves the mountain was likely to make next. Their understanding of the processes of volcanism supplied the operation with its scientific underpinnings, upon which ECC strategies would be built.

Even when activity on the mountain settled into temporary lulls, there would be no rest for the people manning the ECC. Theisen recalls:

"...prior to the 18th, we were really involved in a lot of negotiations on establishing zones and trying to keep people out. The more the snow melted, the more access became available, so we were just as busy with that type of meetings; there really wasn't any lull in what we were doing. In fact, it was just as hectic when the mountain wasn't doing much because of the predictions and trying to get things moving. There was always something: gates to put in place...I think I was on the phone or in a meeting from the time I walked in until the time I left..." (Theisen Interview)

The fascination an erupting volcano worked on people inevitably drew some of the more adventurous--or perhaps, as events would show, the less cautious--to the mountain like moths to a candle. They clamored to reach vantage points, the closer the better; a few scrambled up the shifting slopes of the mountain itself in search of a first-hand encounter with its disquieting yet spellbinding displays. There seemed to be a peculiar exhilaration in tempting fate.

"We had people sneaking up on the mountain," in Ed Osmond's words. "We'd have to go up and take them off...at the risk of choppers almost crashing...and they'd be back there the next day, [with] camouflage outfits to...beat the system..." And troubles over access did not stop with a few thrill seekers or an occasional over-zealous reporter.

As supervisor of the Gifford Pinchot National Forest, Bob Tokarczyk would soon become intimately acquainted with how varied and vocal people could be, descending on him and his beleaguered staff with every possible reason--some convincing, others merely silly--to be allowed in under the shadow of an active volcano.

Tokarczyk knew the Mount St. Helens country and its people as well as anybody. His associations with them stretched back to the late 1940s when he began working summers as a fireman at Spirit Lake during his college days. He had led numerous climbing parties to the mountain's summit, even participating in the recovery of bodies in July 1950 from a C-47 transport plane that had crashed on its slopes the previous winter. Trained in forestry at Washington State University, he had served at Packwood and Randle in the Gifford Pinchot National Forest. His career took him south to Oregon assignments, and then to the District Ranger's post at Mt. Adams.

Becoming Gifford Pinchot National Forest Supervisor in 1976, he was "the Boss" to everyone working in the ECC, at the Gifford Pinchot headquarters, its five Districts, three engineering zones, and the Wind River Nursery.

Reflecting on the closures of the mountain, Tokarczyk described the process and its frustrations:

"First we closed the top of the mountain [above timberline]...and of course, a lot of people didn't like that... then we closed down the Geological Area that we'd set up...we closed down the whole mountain... The intent to coordinate with the Sheriffs was somewhat frustrating because they didn't have the funding to take care of that sort of thing... We wrote a letter to...Governor [Ray] saying: ...we have to have State land closed down within National Forest boundaries, and she finally did that..."  
(Tokarczyk Interview)

And then there was the mounting furor over closures, which he vividly recalled:

"We were given a lot of hassle by the summer homeowners in and around [Spirit] Lake prior to May 18. We were given a lot of hassle by the loggers, because loggers felt they could be warned when an eruption [was imminent]...and that they could get out of the way... [There were] phone calls in the middle of the night asking for special jurisdiction to stay inside the area...There [were] some evenings I'd sit down to supper, probably not starting 'till seven, and wouldn't get to [eat] until nine because there'd be phone calls..." (Tokarczyk Interview)

The closures ran head-on into furious resistance. The loggers had jobs at stake; and owners of valuable summer homes demanded--sometimes through their lawyers--their right of access. Then, there was the problem of the YMCA and Scout camps along the shores of Spirit Lake. Tokarczyk remembers being confronted with: "What are all the kids going to do now...?" The same reactions buffeted the ECC staff. "Several lawyers called me," Stenkamp recalled, "wanting to know what our legal authority was for keeping people away from the mountain... I didn't know, so my stock answer to them was: to find out what I was doing illegal and to call me back. None of them [did]..." (Stenkamp Interview)

Forest Service personnel staffing the ECC were drawn from far beyond the Gifford Pinchot National Forest. They were detailed on 30-to-60 day stints from other Forests in Oregon and Washington, as well as from outside Region 6. Running this sprawling 24-hour-a-day operation, which involved at one time manning as many as 44 closure gates, was simply beyond the capacity of any one Forest staff. Stenkamp would later be particularly generous in his praise of some 30 fire management people flown in from Region 3 in Arizona and New Mexico.

Looking back over the entire ECC operation, Jim Unterwegner may have captured the essential quality of it all in summing up his experience with the public information arm:

"It was a most interesting place to be, because this was where it was all happening. All the first reports mostly came in here... It was frantic here. I mean there just wasn't time to think too long about things. You had to react and react quickly..."  
(Unterwegner Interview)

### An "Ominous Bulging"

The April 17 newspapers were full of accounts detailing the Forest Service's frustrating cat-and-mouse game with dare-devil climbers. A column appearing in the Eugene, Oregon Register Guard on that same day scoffed at the need for closures, concluding: "Until some new evidence of an emergency appears, people ought to be able to travel roads in the Mount St. Helens area, log the timber, fish the lakes, use their houses and cabins, and even climb on the volcano." Such "new evidence" was there, but only for those with eyes to see.

In the conference room next to the Fire Control Office, the USGS geologists had been laboring to understand the reasons behind new data showing that the mountain's shape was undergoing a remarkable change. As early as April 24, the Longview Daily News reported, in an interview with David Johnston, the discovery of "two surprisingly large bulges on the top of Mount St. Helens." The article, by reporter Rick Seifert, quoted Johnston as saying: "A major deformation like this is pretty extreme. It surprises us, to be quite honest. It's not that it is totally unexpected, but it is a pretty major change in the shape and size of the volcano." Next day, April 25, Unterwegner issued a news release that spelled out the evidence in detail:

"USGS people have now been able to make more accurate observations and have determined that the north flank of the mountain has gone through a large displacement of material. A pinnacle on the north crater rim now stands 250 feet higher than did the corresponding point before the first eruption. Also, a large bulge at the head of Forsythe Glacier has been displaced 300 feet outward or upward (or both). This further confirms the possibility that a landslide occurring on the north flank could be triggered by an earthquake."  
(National Forest Teletype Update, April 25, 1980)

Toward the end of April, this strange new development was receiving wide attention by the press. A headline in the April 29 edition of the Roseburg, Oregon, News Review proclaimed: "St. Helens showing 'ominous bulging.'" Some newspapers displayed photographs of the volcano's fractured, sinister-appearing northern slopes, opposite stories speculating on the likelihood of a massive landslide of rock and ice. On May 1, the Vancouver, Washington, Columbian reported Governor Ray's order "declaring parts of the mountain danger zones and off limits." Skamania County Sheriff Bill Closner was quoted in the same article describing the installation of two new padlocked gates on Highway 504 leading to Spirit Lake. Both actions were taken with a wary eye on the menacing bulge and its apparent potential for sudden and catastrophic destruction.

Yet, according to George Theisen, there were some people who seemed absolutely convinced that the dangers portended by the mountain's swelling could be disregarded with impunity. Others drifted somewhere in the gulf between belief and doubt. Recalling that on May 17 the summer homeowners at Spirit Lake demanded and were allowed permission to their property, Theisen described the prevailing mood of skepticism:

"...the State Patrol escorted--through political pressure--people right beneath the bulge in the mountain...so I don't think people really realized the potential. I am not sure that I did, although I like to think I did...Slowly you could see people believing that maybe some of it would happen, but I don't think anybody ever thought they would get [what did happen]. I think they would scoff at anything that USGS said." (Theisen Interview)

Elaborating on how mixed reactions could be, Theisen continued.

"There were a few people that believed it. One fellow in the State Patrol, a captain I think,...really realized and believed that all this could happen, and probably more...When a new increase would come along like some severe venting of steam or some snow avalanches, then people would start getting excited and they would kind of believe it again...then politics would begin to come into it, economics...[People] would...lose their concern of anything ever happening and wanted to get back to business as usual... It was just a series of fights to get people to listen to what the geologists said. Everybody that went in there--and I suppose everybody was guilty of it--every body kind of heard the geologist say what they wanted to hear them say. They weren't really listening to them." (Theisen, Interview)

What the geologists were saying, and what so many people seemed determined to ignore, was that the north slope bulge represented, in the view of USGS, "the most serious potential hazard posed by current volcanic activity at Mount St. Helens." (USGS, Earthquake Information Bulletin, July-Aug., 1980, p.146)

Words attributed to Cowlitz County Sheriff Les Nelson, in an April 29 Longview Daily News article by Donna du Beth, revealed that warnings about the bulge did not go unheeded by everyone. "I've got a stack of daily reports from the U.S. Geological Survey dating back to when this thing began," he is quoted as saying. "It's like reading a scary story that's building to a final climax."

Not even the geologists would be entirely prepared for the enormity of the climax when it finally did come. The mountain, in its disarming beauty and deceptive behavior, would tempt even the best informed into some degree of error. And there, riding on the simplest misjudgement, would sometimes unknowingly lurk a choice between life and death.

In the Volcano's Shadow

There seemed to be no end to the reasons Spirit Lake homeowners gave for their demands to unlock the gates on Highway 504. Governor Ray had relented enough to permit a group of disgruntled property owners to go in and check on their homes, retrieve belongings, and even feed a pet cat left behind. The day was Saturday, May 17, when the State-Patrol-escorted caravan headed for the homes and cabins nestled at the foot of the mountain's north slope. Next day, the sometimes acrimonious events of this foray were reported by Leslie Zaitz in the Sunday, May 18, edition of the Portland Oregonian. The article also explained that a second opportunity to return would be offered that same Sunday; sign-up time would begin at 10:00 a.m.

Elsewhere in the volcano's vicinity, the gradual revival of forestry activities had brought other persons back with tasks to perform. Kathy Anderson was among the Forest Service personnel whose duties would require close approaches to the mountain's ash-streaked and quake-ridden flanks in the fateful days leading up to May 18.

By May 3, a large tree planting contract, awarded to an Oregon firm called Webfoot Reforestation, was underway on clearcut lands surrounding Mount St. Helens in a broad arc swinging from the northeast around to the south. Anderson was the project's Contracting Officer's Representative (COR), with responsibilities for logistics and ensuring compliance with terms of the contract. Besides herself, there were four Forest Service inspectors, and 20 contractor's employees working on the tree-planting operation.

Because of the volcano's ominous behavior, the undertaking had experienced frustrating delays and modifications from the beginning. And now, with the work finally in progress, each decision as to where and when the crews would be sent had to be carefully weighed in deference to the mountain's brooding presence and fitful moods. Anderson remembers the safety precautions she adhered to:

"We had been trying to avoid working close to the mountain . . . I felt we wouldn't work there unless [there was] clear weather, good visibility, reassurance from the USGS that the mountain was stable . . . [and] that we would have enough personnel to handle an emergency situation." (Anderson Interview No. 1)

At the outset, she had gone up to the closest and, she thought, the most dangerous planting area, in clearcuts on Marble Mountain barely five miles south of the volcano's restless crater, accompanied by an inspector, to identify an evacuation route. "We had a grader smooth the road," she later explained, "so that we did have an evacuation route we could travel on." (Anderson Interview No. 1)

They began planting in the more distant and presumably safer, Clearwater Creek drainage. The planting sites there were up to ten miles northeast of the mountain's bulging slopes, and with the protection of two intervening ridges, the Clearwater seemed less threatened than the sites they

would have to work at Marble Mountain. By Saturday, May 17, they were working the west side of the Clearwater basin on the northeasterly slopes of a ridge bordering the drainage of a small stream called Bean Creek. It was one of the two ridgelines seeming to offer shelter from anything the mountain might hurl in that direction. Maps gave this feature no name, but Anderson would remember it as Bean Creek Ridge.

There had been a mix-up over some of the trees for planting, and, as COR, Anderson had been forced that Saturday afternoon to drive to the Wind River Nursery, some 30 miles to the south. Returning with a truckload of trees, she took the Canyon Creek route back to Chelatchie Prairie. It was a curving, twisting road she was unfamiliar with. Fighting back sleep after putting in nearly 14 hours, she radioed Chelatchie, at one point, that she might need help making it in. Remembering that solitary journey, Anderson later described how it shaped her plans for the next day:

"I was listening to the radio as I was driving, and the radio announcer said that it was going to be sunny and warmer the next day and probably about 80 degrees. . . I started thinking about it . . . I'd been real apprehensive about working on the southside of the mountain because we had some units that were less than five miles from there, and I knew we had about three days work. . . I'd made the decision earlier that I wouldn't. . . have all those people work that close unless we had real good coverage as far as Forest Service personnel. I had two inspectors with each crew, and I didn't want to do it unless we had good clear weather, so that we'd have visibility. . . So, we had good clear weather and [we] had enough people. I thought [those were] some good reasons to switch and go there [to the southside]. (Anderson Interview No. 2)

The impending break in the weather also meant another factor to consider. She explained:

"The [Clearwater] units we were going to work on were north [easterly] slopes which, on a hot day usually would get shut down for humidity early in the day. So, then. . . as to why not work at the Clearwater came down to the fact that those were dryer sites, more exposed . . . and we'd probably end up getting shut down earlier in the day . . ." (Anderson Interview No. 2)

She was still uncomfortable about making this change in plans, because the usual practice was to complete one area before moving on to the next. There was also the need to check in with USGS concerning their most current readings on the mountain's behavior. She recalled:

"I got back in and I called Dan Miller [USGS geologist]--it was about seven by then . . . He told me they would have someone making observations all the next day--it was David Johnston--that he'd be up there all day on Sunday making observations, and that he [Miller] would be working in the Vancouver office watching the seismographs. . . He was glad that I'd called to let him know where

we were thinking about working, and if we changed locations any-time during the day to radio that back in so he could keep tabs on where we were. . . He ended up, overall, saying that he felt that things hadn't changed on the mountain enough. . . [and] that if changes did occur, they thought they could get us a two or three hour warning..." (Anderson Interview No. 2)

With her mind now made up, Anderson had only to call and check with District Ranger Ken Johnson to confirm the change in tomorrow's plans. As she later recounted, he responded to her query with no objections. The four inspectors and the crew members were told that evening of her decision to go in close on the south side the next morning. "One of my comments . . . to the people when I told them," she remembered, ". . . [was] that I thought we'll just take it one day at a time. We'll see how tomorrow goes. . ." (Anderson Interview No. 2)

So, for all of them, their places in tomorrow's events were now irrevocably fixed. That evening their thoughts must have turned uneasily to what being so close to the volcano's shadow might bring. But there was no way then for anyone to know how fateful Kathy Anderson's change in plans would prove to be.

The morning of May 18 dawned clear, just as the weather report had forecast. About 7:00 a.m., the trucks of the tree planting caravan swung onto the highway at Cougar, proceeding up Road N90 to the N83 turnoff. Sometime before 7:30 a.m., they reached the flats north of Marble Mountain where the planting units in which they would be working lay. Mount St. Helens' ash-covered cone loomed starkly above them, its troubled slopes stretching in their direction, unobstructed by any feature that might offer shelter from harm's way.

Kathy Anderson later described how she had envisioned her schedule for the day:

"When we arrived at the units, two inspectors worked with one crew and two with another crew. My intention for the day was: after I showed all the inspectors the evacuation route, I was going to return to the Clearwater drainage because we had smoke reported on Saturday by one of the planters. . . so, by about 11:00, I was going to head up there." (Anderson Interview No. 1)

While events would soon intervene to alter the schedule, she proceeded according to her intentions. Recalling what happened as the first hour on the job ticked by, she continued:

"I took one inspector from the smaller crew and . . . showed him some of the other clearcuts we were going to be working on, and then [I] took him up to where the evacuation route was. . . [It was] planned . . . to go up over the west side of Marble Mountain and down off the southwest side back down to the N90 road along Swift Reservoir and then. . . to Cougar. I took [him] up there and showed him the evacuation route, and I headed back down the hill and went over to the other clearcut where the two other

inspectors [Valerie Sigfridson and Kate Brennan] had been working. I had told them I would be back in about a half hour to pick up one of them and show her the evacuation route. That crew was working downhill in the bottom of a unit . . . they were about 500 from the road. . . clear in the bottom of it. . . I visited with them and said I would be back. . . The fellow that was with me [Kran Kilpatrick] got in the truck and [we] had just headed down the hill . . . about a half mile from . . . the crew . . . when I observed that the mountain had started to do some-thing."

(Anderson Interview No. 1)

It was then a minute or two after 8:30 a.m., when all sense of time dissolved in a cascading rush of things happening suddenly and simultaneously. Anderson remembers that John Morris, the inspector remaining with the crew she was now returning to, tried to use his small hand-held radio to call the District office. "I cut him off with my radio," she related, "because I knew it was a stronger one, when I realized he couldn't get through. . . I just reported that the mountain was erupting, and by that time--just a few seconds had passed--it was obvious it was more than anything that had happened before. I just reported that the eruption was big and that we were going to leave."

(Anderson Interview No. 1)

This radio message would be the first word to reach Forest Service officials about the great May 18 eruption. In the Vancouver office, Jim Unterwegner remembered the transmission being intercepted: "We heard . . . the tree planting people . . . radioing into St. Helens [Ranger Station] . . . that a big event was occurring that looked . . . much larger than anything we'd seen. All of a sudden, the phones started ringing. . ." (Unterwegner Interview No. 2)

Anderson was now also frantically radioing the inspectors with each crew "to get their people and get out of there!" She stopped the truck, throwing it into reverse to turn around and head back to the clearcut they had just left. "Before I had a chance to swing the truck and even back up. . .," she recalled, "there had been a burst of dark, very black ash go up, but only probably about 600 or 700 feet. . . It stayed there but it didn't get any larger, and that was when we started observing what was the lateral blast--but from the side because we were to the south." (Anderson Interview No. 1)

Odd and incongruous things rushed through her mind in those first few moments. She remembered telling the crew the night before how they would "just take it a day at a time," and that phrase now kept recurring in her thoughts. (Anderson Interview No. 1) There was little opportunity to stop and comprehend what the mountain's convulsive eruption really meant. "I know I mentioned to Kran, the fellow riding with me," she related later, "I said: 'I don't understand it;' because I could look clear across Smith Creek Ridge which is about seven miles out, [where] there was a black streak in the sky. . . It was a very thin streak. . . that projected clear out and had already reached that point." This peculiar black streak, like some harbinger of doom, was etched on an otherwise serenely clear and blue sky.

(Anderson Interview No. 1)

Once the truck was turned around she raced back up to the clearcut they had just left. The crew there, consisting of twelve contractor's employees and the two inspectors, had been working far downslope from the road. She shouted for "them to just drop everything and run up the hill," and, as the crew dashed towards the road, she had Kilpatrick break out pollen masks from behind the truck's seat. "It took about ten minutes before everyone was up the hill . . .," she recalled, "and as they came by, Kran passed out pollen masks. Everybody got loaded and we took off." (Anderson Interview No 1)

Anderson's concern now turned to the people in the other crew. "I radioed . . . trying to keep constant communication with the other crew because [the inspector with them, John Morris] didn't have any idea where the evacuation route was. . . So I kept giving instructions over the radio to proceed on up the road to a certain intersection. . .; and we proceeded up to that point and met with him and the other crew of eight." (Anderson Interview No. 1)

It was also about this time that they were requested by the Vancouver office "to radio in what we were observing as we saw it." What they were seeing at close range was a spectacle so vast and fearsome that words could barely be found to convey even the scantiest reflection of its reality. Later, trying again to express something of what they witnessed, Kran Kilpatrick wrote of their experience:

"The eruption of the southeast side was like a slit opening and a big push of ash going upward as well as down the side of the mountain at a tremendous rate. Seconds . . . later, the west side of the mountain lifted up, then settled, sending a huge cloud upward and downward. I want to emphasize the downward push, because this was the most terrifying part to me. These two plumes grew so rapidly that it was just unbelievable. They were up to 20,000 feet in a matter of seconds. Kathy and I were very upset . . . it seemed as though we were not going to survive . . . The push down the sides of the cone appeared to be pyroclastic flows, moving at a fantastic rate, with huge billowing clouds rolling down the west and southeast sides, throwing rocks ahead of it." (Kilpatrick p.2)

Anderson was trying to keep control of the wheel and relay Kilpatrick's verbal descriptions over the radio. She later recounted what it was like:

"We kept reporting back in. I know there were shots going slightly to the west and another shot would go slightly to the east and ones would come in a direction slanted over towards the south in our direction; not horizontal by any means, more vertical. We saw a lot of pyroclastic flows come off the flanks until, actually, when we got to the point where we had met the other crew--which probably was only another five to ten minutes--most of the base of the mountain was completely enveloped in a hot-looking white cloud just from all those pyroclastic flows. . . All of us were pretty near panic. . . because we just felt like, basically, we were just running for our lives and we didn't know whether we were going to make it. . ." (Anderson Interview No. 1)

With everyone assembled at the intersection, they started down toward the N90 road, only to be faced with an immediate dilemma. Anderson had earlier been cautioned by the USGS geologists to be wary of pyroclastic flows touching off mudflows in the Swift Creek drainage, and their evacuation route unavoidably took them directly across the bridge at the Swift Creek canyon. She now radioed for a Forest Service spotter plane to check the situation, bringing the column of trucks to a halt. They waited for about ten minutes, she recalled, "at a point that was a large landing area that I figured a helicopter could land at, if necessary, while we waited to have the Forest Service plane check the drainage. ." She described what then happened:

"During that time we were sitting there . . . a lot of the contractor's people came very close to full panic. A fight broke out in one of the trucks because one of the guys had threatened that he was going to run off into the woods. He didn't feel safe . . . sitting there in the truck waiting. By that point, we had a heavy ash cloud which had rolled over us. . . It wasn't but just a few hundred feet over us, and it was just billowing by us. . . it was so dark. You could see things so distinctly in it that I thought sure, myself, that debris would start falling out of it at any point. I radioed back to the other two . . . government vehicles that had radios to put their hardhats on because I thought sure we were going to get pounded. . . A lot of lightning from that cloud was striking every which way, plus . . . convection. . . was causing real strong ground winds. We were in about 20-foot tall reproduction. . . and had trees just swirling around. . . and you could smell the gases real strong at that point." (Anderson Interview No. 1)

They were finally advised by radio that a plane could not reach them any time soon, and that they would simply have to check the Swift Creek Bridge themselves. Now, to everyone's relief, the column pushed ahead again, but with no certainty as to what would be found at the crossing. Upon reaching that critical point, their hopes were buoyed when they discovered the bridge intact, no sign of mudflows, and the way open to Cougar. The only mishap awaiting them now would be brakes failure on one of their trucks, forcing its abandonment on a hill west of Swift Creek.

And so, in hardhats and dust masks, they emerged from what was now, quite literally, the shadow of the volcano's towering plume, shaken by their harrowing escape, but thankful at being spared. Had they then known of the devastation visited on Bean Creek Ridge, or perhaps in reflecting on the small ironies their deliverance had depended upon, they--in common with the Spirit Lake homeowners--might have wondered at how finely the line between survival and extinction could be drawn.

The mountain's preliminary stirrings were over.

## PART III: MAY 18 AND ITS AFTERMATH

The May 18 Eruption Sequence

On Sunday morning, the eighteenth of May, Mount St. Helens exploded with a force which could only be compared to other incomprehensible forces. The mountain known to the Cowlitz Indians as "Person from Whom Smoke Comes," unleashed an assault on the region profoundly altering the contours of the land. The blast spared nothing, respecting neither human nor forest life. It ravaged whatever stood in its way, whether it was a young scientist gathering information for the study of volcanology or majestic Douglas-fir trees blanketing the mountain slopes and valleys; whether it was pristine streams winding through the forest or the heavy equipment of the logging companies extracting the renewable timber resource. The destruction to Federal, State, local, and private lands and resources has been quantified; the economic impact has been fully measured; and the long-range effects on the environment are under intensive study. The qualitative measure is far more elusive. The mountain was a source of great beauty, unchanged in our lifetime. It was the playground for thousands of skiers, backpackers, amateur botanists, climbers, and campers. For those who were intimate with the mountain the violent eruption of May 18 bordered on psychic shock. Roland Emetaz reacted with dismay after flying over the Spirit Lake region on May 23, later commenting:

"I'd seen the pictures on television and I'd seen the pictures in the newspaper and I'd heard the stories from people who had been there, but you didn't get the full impact until you had a 360 degree view... It was really tough for me because I was familiar with that country... and I had a hard time just recognizing things that were very familiar. It was difficult to get oriented. It looked more like parts of Yellowstone National Park with the hot potholes and geysers than it did Spirit Lake. It was really traumatic." (Emetaz Interview)

Packwood District Ranger Bill Truitt echoed the shock felt by Emetaz. Truitt saw the destruction for the first time while serving as a fire boss two months after the May 18 eruption.

"I felt very depressed... after my first aerial visit. I had flown the area a number of times prior to the eruption... and I can remember all the green, lush forests. But after the eruption... it was just terrible." (Truitt Interview)

For two months Mount St. Helens had rumbled, quaked, bulged and spouted, becoming the most closely watched attraction in the United States, if not the world. Scientists monitored the mountain and tried to determine what it was going to do. Seismic activity, once as great as 40 events per hour, decreased on consecutive days from May 15 to 17. Geologists of the USGS hoped it was a sign of decreasing danger.

By all accounts May 18 dawned a beautiful, clear Sunday morning. Keith Stoffel, a geologist who works for the State of Washington's Department of Natural Resources, was flying over the mountain with his geologist wife Dorothy and a young pilot, Bruce Judson. Stoffel remembered: "The thing that so impressed us was that it was so serene. There was virtually no activity. Just a few wisps of steam." (Denver Post May 23, 1980, AP) Within minutes the Stoffels were literally in a flight from death.

A series of geological events began at 8:32 a.m. that created a new world around Mount St. Helens. An earthquake of at least 5.0 magnitude shook the volcano, severing the precarious attachment between the north flank "bulge" and the mountain. Fred Grimm, pausing during a climb of Mount Adams, said "Within two or three seconds, it appeared that the north side of the mountain just blew out." (Newsweek June 2, 1980, p.22) The massive landslide down the north side of St Helens "relieved the pressure from the upper part of the volcano and caused the eruption." (Crandell Interview.) Keith Stoffel recalled:

"Right as we came across the crater, only 1,000 feet up, I saw the inside of the crater wall start to landslide down the steep slopes... We were almost directly over it... It began to look like someone had just sliced a straight line right across the summit crater from east to west. Everything north of that line started to ripple and churn up. Suddenly... the north side of the mountain just caved away, slid away... I thought it was the neatest thing I ever saw in my life. Within a few short seconds a huge blast of ash came right out... That's when I said, 'Let's get out of here!'" (Denver Post, May 23 1980, AP)

The initial blast was followed by an explosion that blew the north side of the mountain apart. The few seconds delay between the blast Stoffel described and the ensuing eruptive explosion allowed the pilot of the Stoffel aircraft enough leeway to escape the fury of the volcano. The volcano exploded laterally, due to the release of pressures built up beneath the bulge, eventually sending steam and ash to over 63,000 feet above sea level. Donal Mullineaux of USGS provided a simple, succinct account of the eruption. Testifying before the Senate Commerce Committee hearing in Portland, Oregon, June 13, 1980, Mullineaux noted that following the earthquake and avalanche:

"the volcano began to erupt violently. A hot lateral blast devastated an area that overwhelmed about 500 square kilometers [180 square miles] with hot gas and rock fragments, knocking down trees to distances of as much as 25 kilometers [15 miles]. Winds carried volcanic ash [east and northeast] across Washington, Idaho, and Montana, then southeasterly across the central states and [east-northeast again across the rest of the nation. Beginning in the early afternoon, hot masses of pumice and gas, called pyroclastic flows, streamed down the north flank of the volcano. The debris avalanche produced a huge 25-km-long [15 miles] deposit in the North Fork of the Toutle River adjacent to the volcano; mudflows extended down both the North and South forks of the

Toutle, and significant floods extended as far as the Columbia River. The lateral blast extended about three times farther than any such blast recorded by the geologic history of the volcano; the distribution of wind-carried ash, pyroclastic flows, mudflows, and floods, however, closely match locations and extents anticipated from the geologic record, and most people had previously been evacuated from the most severely affected areas." (Mullineaux Statement)

Mullineaux gave an understated account of the magnitude of the eruption. He makes, however, two salient points that must be understood to appreciate many of the problems facing the Forest Service and other agencies which played a role in managing the St. Helens crisis before and after May 18. First, he notes that the lateral blast extended further than any other similar occurrence in the volcano's geological history. And second, most people in the area had been evacuated from the areas severely damaged. Both points intertwine. Thirty-five persons are known dead as a result of the eruption and an additional 25 are listed as missing, many of whom were inside restricted areas in violation of closure orders. Only two of those killed had official reasons for being inside the red zone. The death toll could have been much higher if officials had buckled under the public pressure to allow access into the area. Significantly, a number of people outside the restricted area were also killed by the volcano. In 1978 Dwight "Rocky" Crandell and Donal Mullineaux had drawn a "hazard zone" around St. Helens which extended less than half the distance of the May 18 blast impact area. There simply was no way to predict the force and breadth of the lateral blast.

David Johnston, the USGS volcanologist who well understood what the sequence of eruptive events might be, also underestimated the lateral blast potential. Fearing the avalanche that would occur if the north flank slumped, USGS moved Johnston's monitoring station from the timberline area on the mountain slope to a ridge five miles north of the volcano and over 1,000 feet above the valley floor. It was thought this location would be safe. Yet, the blast destroyed this position and neither he nor his equipment have since been located. William Menard, USGS Director, when pressed by the Senate Committee on Appropriations concerning the failure to issue a warning regarding the blast, answered the criticism by insisting that USGS could predict an event but not its magnitude. "If we had thought there would be an explosion out of that spot [the bulge], we would have said so. If we thought there was going to be an explosion, we wouldn't have had our man there." (Senate Hearings, June 10, 1980, p.33) As Mullineaux pointed out, no blast of the power of May 18 had ever been experienced at St. Helens. Crandell, who co-authored the hazard study of Mount St. Helens with Mullineaux, reiterated the point:

"The one thing that happened that we did not forecast was the lateral blast on May 18. So far as we can tell, nothing like that has occurred at Mount St. Helens. And when you base an assessment on what has happened, this is something that has not happened, there [was] no reason for us to suspect that it could." (Crandall Interview)

Mullineaux noted the four primary components of the eruption: the north flank avalanche, lateral blast, vertical blast, and pyroclastic flows. His stark description before the Senate Commerce Committee does not impart the extent of the volcano's impact. Each stage of eruption exhibited its own peculiar characteristics and form of destruction. Each was deadly by itself. Working in concert, they created a situation unique in the history of disaster management in the conterminous United States.

#### North Flank Avalanche

The first three eruptive components occurred within seconds of each other being triggered by the 8:32 a.m. earthquake. The slump of the north flank "bulge" sent 100 city blocks of debris into the North Fork of the Toutle River. This was the beginning of the north side and northwest side flows which changed the elevation and course of the Toutle, created a new shape and depth for Spirit Lake, and produced a destructive flood with effects felt as far away as the Columbia River.

#### Lateral Blast

As the north flank of the mountain swept down the slope, the pressure pent up inside the volcano was released in a lateral blast estimated to equal 500 atomic bombs of the size dropped on Hiroshima. The force of the blast, in the form of a superheated shockwave, blew down everything in its path in a 15 mile arc to the north. The blast was directed straight ahead, down into the valley and along the contours of the land. At the point the blast dissipated enough to allow the vegetation to withstand the force, the heat accompanying the shock wave scorched timber in a ring around the blow-down area. The lateral blast also fueled the avalanche by ejecting massive quantities of ash and debris. The horizontal ash explosion combined with pyroclastic flows, which pushed the north flank debris 17 miles down the Toutle River valley, and along with mud flows filled parts of the valley to a depth of 450 feet. The flow of pyroclastic material and mud essentially regraded the Toutle River establishing a new bed considerably above what it had been. The flow of debris was compounded by timber downed by the blast which was swept up by the flows and flood waters.

Additionally, hundreds of thousands of board feet of logs from Weyerhaeuser's Camp Baker facility were carried away by the raging flood waters.

The flood surged down the Toutle River destroying over a dozen bridges. It continued on into the Cowlitz and eventually deposited tons of debris in the Columbia River, transforming a 40 feet deep and 600 feet wide channel into a 14 feet deep and 200 feet wide impassable waterway which trapped 31 ocean going vessels in Portland and Vancouver. In places where the Toutle had been 300 feet wide, it swelled to over three-quarters of a mile, and swept up everything in its path.

The ash directed by the lateral blast was responsible for many of the deaths resulting from the eruption. Sue Ruff and Bruce Nelson, who were camping near Green River outside the Forest Service red zone but within the blow-down area were lucky. Ruff recalled:

"We looked toward the mountain and saw this thick yellow and black cloud rushing toward us. I remember thinking I should take a picture of it, then I thought we'd better hide. Bruce grabbed me, and the next thing we knew we were under piles of trees. All we saw was black ash coming down on us. It took out all the trees. It covered our camp. It was terribly hot and our mouths were full of mud." (Columbian, May 22, 1980)

#### Vertical Blast

Virtually on the heels of the lateral blast came a vertical blast of equal intensity which carried steam, gases, and ash 15 miles into the atmosphere. In conjunction with the explosion from the north slope, the vertical eruption ejected shattered rocks, pumice, huge blocks of ice, and several feet of ash over the immediate mountain area. The prevailing winds caught the ash surging into the atmosphere, carried it east and east-northeast across the state, blacking out Yakima in the middle of the day. The ash limited visibility throughout eastern Washington, Idaho, and western Montana. Driving conditions were impossible. The ash eventually circumnavigated the earth.

Kathy Pearson, a forestry technician at the Packwood Ranger District, was camping on Vanson Peak, 15 miles north of St. Helens. She and three friends outran the ash from the two blasts. She recounted her experience later:

"...I know that all of us knew that we were dead, it was just a matter of when it would happen because the cloud just kept getting bigger and bigger and bigger and the lightning was fierce, just unbelievable. The clouds were just purple black. They roared and boiled and it was very, very terrifying." (Pearson Interview)

The ashfall that eventually did catch Pearson was wet and created no breathing problems. The lightning she referred to was caused by the highly charged ash clouds. Bolts arched thousands of feet through the clouds igniting many of the 30,000 acres of forest fires which resulted from the eruption.

#### Pyroclastic Flows

Pyroclastic material from the volcano raced down the slopes of St. Helens at speeds of 60-90 mph. Reaching temperatures near 900° F., the flows melted snow and ice thus fanning the already growing flood waters and enlarging the mud and debris flows. The heat generated by the flows--a combination of hot dry rock debris and superheated gases--raised river and lake temperatures. Columbia Helicopters pilot Dwight E. Reber, flying near the west slope during the eruption noted the effect of the flows:

"There is a flow of white burning everything it touches as it moves down the west side of the mountain. Everything is hot and gray. There are places where the water of the North Fork of the Toutle River appears to be boiling." (Columbian, May 19, 1980)

Tim Hait, a spokesperson for USGS throughout the course of Mount St. Helens' various eruptions, told the press following May 18 that "The topography at the earth's surface can be changed instantaneously, for example by Mount St. Helens." He noted that Spirit Lake and the Toutle River valley had changed dramatically and that "maps [of the region] all of a sudden are useless." (Columbian June 1, 1980) Not only did the volcano alter the landscape around it, but the explosions transformed the mountain itself. The top 1,300 feet of Mount St. Helens was blown off along with the north flank leaving a two mile long crater with the south rim elevation at 8,300 feet and the northern rim only 5,000 feet. In the space of a few short hours Mount St. Helens dropped from Washington's fifth highest peak to thirtieth.

#### The Events of May 18 Remembered

Of all the crisis managers, Ed Osmond had perhaps the best understanding of the eruption's magnitude during the first day. He flew the mountain while returning from Bend, Oregon at mid-day. Yet, even with that experience, he noted that one could understand it only after being on the ground in the midst of the destruction to "touch and feel it." (Osmond Interview) To a person, the people who directed the ECC knew that something big was occurring, but no one guessed the enormity. In this context of uncertainty, the Forest Service initiated its response, setting in motion the ECC and internal operations.

Only two people, Jim Unterwegner and Linda Weimer, were in the Vancouver office the morning of the eruption. They heard the call from Kathy Anderson with the planting crew south of the volcano, reporting the beginning of the eruption. USGS confirmed immediately the earthquake which set the mountain in motion. Within minutes the Washington State Patrol and DES were alerted. The former cancelled the planned escort of property owners into the Spirit Lake basin scheduled for mid-morning.

All the ranger districts were contacted by Forest Service radio that a major eruption was occurring. Bill Harteloo at the St. Helens Ranger District coordinated, by radio, the evacuation of the tree planting crew Kathy Anderson was with. Ranger Ken Johnson decided to evacuate the District Office, then located at Cougar, moving all the vehicles to Jack's Sporting Goods, approximately five miles west. He then decided Chelatchie would be the best site to relocate the District Office. The Regional Office issued a green light for the move that evening.

Bill Truitt, District Ranger on the Packwood District, was working in his yard when his wife heard the news on the Forest Service radio. After confirming an eruption had occurred, Truitt contacted his office. There was a tree planting contract inspection crew in the field at the time. "I wanted to get our crew, as well as the contractors, notified. I wanted to be sure we got everybody back in. My first concern was for the people here--my employees here." (Truitt Interview)

The Vancouver office became a fountain of activity within an hour of the eruption. Key personnel--Paul Stenkamp, Ed Osmond, George Thiesen, and Mike Lowry, among others--were called immediately. Lowry, the forest dispatcher, arrived before 9 a.m. and initiated the call-down of ECC member agencies. Thiesen drove from his home at Trout Lake, through the Columbia River Gorge, and saw the billowing ash clouds to the north along the way. Once everyone arrived, the office scene was tumultuous.

The business of the office changed in a matter of minutes. Osmond noted the effect:

"The office was totally disrupted. It stopped everything because we couldn't go into the Forest. All staff specialists-- everything came to a screeching halt. And they were looking at 'what do they do.' All those people then went to support roles--maintained radio communication, dispatching roles, starting some initial phases of what later became important reforestation efforts, rehabilitation efforts." (Osmond Interview)

Nearly everyone in the office had to shift gears from what they had been working on and turn their attention to some aspect of the emergency. The pace and furor of the office was so overwhelming that ECC coordinators had no time to reflect on what was happening. Center director, Paul Stenkamp, remembered only that

"it was so busy and so complex that I don't know that I could tell you what occurred that day except that we got everybody in gear... We got all our people on, made sure we had our aircraft squared away... I know it was a long grueling day and it lasted all night and into the next day." (Stenkamp Interview)

George Theisen, Stenkamp's assistant, echoed the director's statement. "I didn't have time to really stop and think about it very much. There were quite a few 20 hour days - several in a row." (Theisen Interview)

A Forest Service spotter plane was put in to the air with a USGS geologist aboard in an attempt to gather data on the force and extent of the eruption. One of the things it found was a changed airspace situation. The intensity of the eruption and volume of ash being ejected nullified the effectiveness of previous restrictions. The Forest Service was in contact with the Federal Aviation Administration throughout the day, monitoring the airspace and adjusting air restrictions depending on the actions of the volcano. At 8:45 a.m. the Forest Service requested the FAA to restrict all aircraft, except official planes, to outside a fifty mile radius and 50,000 feet elevation. Those figures were adjusted as the ash plume spread east-northeast and soared to over 63,000 feet. A request by Washington Governor Dixie Lee Ray to fly the mountain on May 18 was denied.

Search and rescue operations were being conducted by several different agencies including the counties, U.S. Army, and the Forest Service. One of the first rescue attempts was to locate USGS volcanologist David Johnston. Theisen recalled:

"We continued to try to get Johnston out. Obviously there was no hope of him...surviving, but we [tried]. I talked to the Air Force 304th Air Rescue Squadron quite often to make another try. They thought they were very close, but they never got past Coldwater. I was talking to one of the guys ... on one of the lead ships. The [landscape] was so changed that he didn't know where he was."

(Theisen Interview)

At 10:52 a.m. the Vancouver office contacted the Mount Adams Ranger District and ordered all access to National Forest land closed. By mid-afternoon, similar orders had been issued to all the Districts on the Gifford Pinchot National Forest. At 3:45 p.m. Supervisor Robert Tokarczyk, signed an occupancy and use order closing the Forest to insure "the protection of public safety." (Order-Occupancy and Use, May 18, 1980) Forest access was allowed for Federal, State, and local officers or members of rescue and firefighting crews. Property owners, scientists, industrial operators, and news media were allowed access after obtaining the proper permit from the Forest Service. No permits were issued on May 18.

The ECC staff, comprised of fire staff or people who had fire experience, knew that the volcano would create a serious forest fire situation. A Supervisor's Office Coordinating Organization (SOCO) team stood by at the Vancouver office and another was on call in Portland. The hot pyroclastic flows and lightning ignited fires on 30,000 acres of land. But while the mountain raged, protection of human life was foremost in the minds of the crisis managers. Tokarczyk refused to commit firefighting teams to the fray. "We're not touching the forest fires until that volcano's cloud backs off. People have been killed already." (Daily Olympian, May 19, 1980)

In order to keep the office as clear as possible, to keep non-essential personnel to a minimum, Jim Unterwegner again set up the information dissemination system, at the Shilo Motel in Vancouver. That action not only cleared, in part, the Forest Service office of reporters, but it also provided the media with better communication facilities. The telephone company installed a number of phones for the use of reporters, as well as for the various agencies using the facility.

The Forest Service office geared up and organized quickly. The first floor of the two-story building housed the firefighting team, the earthquake monitors, and the Forest Supervisor. The second floor was the command center for the ECC. USGS, the County Sheriffs, and Department of Emergency Services, Pacific Power and Light Company, and Portland General Electric Company set up desks during the day. The ECC was operating at full speed in a very short time. Before the day ended, the agency was addressing the issues of security, search and rescue, damage assessment, facilitation of supplies procurement, and information.

Throughout the days following the eruption, Unterwegner remembered, amazing depths of reserves surfaced among those who were intimately involved in dealing with this awe-inspiring event. Immediate and close cooperation developed between the Forest Service and the U.S. Geological Survey, which has continued to the present.

### Adding Up the Destruction

Volcanologist David Johnston had perhaps the best view of the eruption from the Coldwater II USGS monitoring station on a ridge north of the mountain. Johnston was also no doubt among the first person killed by the eruption. In all, 35 people are known to have been killed and another 25 considered missing. The majority died from asphyxiation caused by the quantity of ash that fell in the area. A few were killed by falling trees blown down by the blast. Johnston, listed as missing, may have been thrown from the ridge by the force of the explosion. Compared with volcanic events where the dead numbered in the tens of thousands, the cost in human life from the St. Helens eruption was modest. The 60 dead and missing at St. Helens is an exceptionally small number. Yet, one death is too many. The fact that anyone was killed in the face of warnings and restrictions created by Federal, State, and local officials, testifies to two points. First, prior to May 18, the general public did not fully grasp the danger involved with an erupting volcano. Secondly, as alluded to above by William Menard and Dwight "Rocky" Crandell, even those who spend their lives studying volcanoes could not fully predict the fury of Mount St. Helens.

Individual human suffering transcended the loss of life, injuries to survivors, and the grief of families of the dead. The loss of private property resulting from flooding of the Toutle, Cowlitz, and Kalama Rivers included 300 homes damaged or destroyed. Approximately 1,000 people were left homeless, with thousands of others evacuated and needing temporary shelter. The extent of damage and its costs to individuals will never be accurately figured because the effects of the eruption were so widespread. People were left jobless for a time; automobiles were damaged internally and externally; the ash damaged tools; clean up of private property was costly.

Immediate estimates of losses were confused and conflicting due in part to the inaccessibility of the damaged area. Additionally, the ultimate effects of ashfall on crops and livestock could only be guessed at. Lyle Jacobsen, Director of Financial Management for the State of Washington, estimated for the Senate Committee on Appropriations that total losses incurred from the May 18 and May 25 eruptions surpassed \$2.7 billion. That figure, as given the Committee (Senate Hearings, p.224), included:

Impact on State Agencies	943.2 million
Impact on Local Units of Gov't.	228.1 "
Impact on Private Enterprise	1,173.0 "
Additional Cost Impacts (including flood control, federal land)	<u>384.0</u> "
Total	\$2,728.3 million

The itemization of cost impacts indicates the problems of disaster management and its far reaching effects. The figures include loss of timber revenue, fisheries and game, and cost of ash and debris removal--all readily expected costs in such a crisis. But added to those are welfare caseload costs for the homeless; food stamps; health and safety monitoring programs, including air and water quality testing; construction cost increases stemming from delay and equipment damage; unemployment compensation; hunting and fishing license revenue losses; repair of sewage treatment facilities among others. The estimates by the State of Washington include all lands affected by the eruption of Mount St. Helens. Following is a damage estimate compiled by the Forest Service during the months following the May 18 eruption. The figures include National Forest, State of Washington, and private forest lands. They include no estimated dollar values for the loss of wildlife, damage or destruction of streams, labor, or loss of recreation visitor days.

### Damage Estimates

#### A. National Forest

##### 1. Land Base

a. Mud flows	15,360 acres
b. Total devastation	6,400 acres
c. Other blast impact area	37,760 acres
d. Ash and pumice covered	
8" plus	62,080 acres
4" - 8"	97,280 acres
2" - 4"	238,080 acres
less than 2"	276,480 acres

##### 2. Resources and Facilities

Estimate of Actual  
or Potential Damage  
or Repair Cost

a. Timber = 1,627 MMBF gross (800 MMBF net)	\$100,000,000
b. Reservoirs = 1,100,000 cu yds sediment to remove	5,500,000
c. Streams destroyed = 100 miles	
d. Streams damaged by ashfall	
severe	52 miles
heavy	297 miles
moderate to light	2,929 miles
e. Lakes destroyed = 2 (6 surface acres)	
f. Lakes damaged	
severe = 1 (Spirit Lake, 1,262 surface acres)	
heavy = 26 (255 surface acres)	
moderate to light = 140 (1,800 surface acres)	

g. Wildlife and Fish		
Blacktail deer killed = 2,000		
Elk killed = 300		
Deer and Elk habitat damage		
severe = 59,200 acres		
moderate = 62,080 acres		
Black bear killed = 20		
Mountain goats killed = 12		
Fishery value lost		
steelhead		106,000
coho salmon		186,000
h. Recreation		
Sites destroyed = 27		
Opportunities lost:		
Developed sites = 544,000 Recreation Visitor Days		
Dispersed sites = 526,000 Recreation Visitor Days		
Receipts lost		25,000
i. Roads		
Obliterated = 63 miles		10,000,000
Asphalt road ash covered = 154 miles		
Gravel road ash covered = 1,560 miles		
j. Bridges		
Permanent = 7	\$	6,500,000
Log stringer = 5		3,300,000
Trail = 5		30,000
k. Trails		
Obliterated = 97 miles		1,200,000
Ash covered = 30 miles		40,000
l. Administrative Facilities		
Buildings destroyed = 15		1,100,000
Buildings in high hazard area = 19		2,000,000
m. Property Markers		
Land lines = 66 miles		
Corners = 334 corners		<u>900,000</u>
TOTAL National Forest damage (excluding lakes, streams, wildlife and recreation visitor days)		<u>\$134,087,000</u>

## B. State of Washington Forest Lands (Department of Natural Resources)

1. Resources and Facilities

a. Timber		
Sold sales lost = 1,278 acres (65 MMBF)	\$	34,000,000
Mature timber = 2,234 acres (112 MMBF)		58,000,000
Reproduction = 6,360 acres		5,700,000
b. Roads		987,000
c. Bridges		586,000
d. Corners reestablishment		101,000
e. Recreation sites		25,000
f. Buildings		58,000

### Damage Estimates (Continued)

#### 2. Maintenance and Administration

a. Maintenance	1,820,000
Equipment	243,000
Roads	
b. Administration	
Maps, photos, soil surveys	258,000
Administration	24,000
TOTAL Washington State Forest Lands	\$101,802,000

#### C. Private Forest Lands

##### 1. Resources and Facilities

a. Timber	\$408,000,000
Mature timber 15,600 acres (750 MMBF)	40,000,000
Reproduction	
b. Roads	5,800,000
c. Bridges	2,900,000
d. Property corners and lines	386,000
2. Maintenance	
Road maintenance	<u>1,805,000</u>
TOTAL Private Lands	\$458,,891,000

#### Eruptions Subsequent to May 18

The losses enumerated above, through their diversity, provide an indication of the enormity of the problems the public and private officials faced as they began to address the issues of relief and rehabilitation. The Forest Service responsibility in the crisis management was complex. Through its role in the ECC and administration of the Gifford Pinchot National Forest, the Forest Service faced immediate response and long range management needs. The difficulties confronting the Forest Service were compounded by the actions of the volcano. The May 18 eruption continued into the following day creating serious obstacles and dangers for search and rescue and damage assessment.

Once the May 18 eruption quieted down, the problems of response became no less difficult. No one could say with certainty what the volcano would do. USGS and the University of Washington knew only that Mount St. Helens remained dangerous. Indeed, the mountain continues in an eruptive mode at this writing. Subsequent to May 18, Mount St. Helens experienced five significant explosive eruptions. None of the eruptions proved lethal nor as destructive as May 18, yet each caused some damage and created varying degrees of hazards. Following the October 16 eruption, a new type of geologic event began occurring--non-explosive "dome building" eruptions--which continue to the present time.

May 25

Even while the region was reeling from the shock of the May 18 eruption; while residents were trying to put their lives back together; and while Federal, State, and local agencies were marshalling resources to respond to short and long range needs; Mount St. Helens spewed ash to previously untouched areas. The eruption occurred in three pulses beginning at 2:15 p.m. on May 24 with a minor pulse, reaching greatest intensity at 2:39 a.m. on the twenty-fifth. Ash extending to 45,000 feet, was blown in two directions by an unusual wind pattern which sent ash above 16,000 feet to the south-southeast and ash below the 16,000 foot elevation, to the southwest. One pyroclastic flow stopped short of Swift Reservoir on the southeast flank of the mountain.

Ashfall proved the major source of damage from the May 25 eruption. Longview-Kelso, Washington, spared on May 18, were buried under three inches of ash. Portland received one quarter of an inch. Eugene, Oregon, Port Angeles, Washington, and the Olympic Peninsula were also dusted. Portland International Airport was closed, I-90 between North Bend and Spokane was closed, Yale and Cougar were evacuated, and eight Washington counties experienced power and telephone failures.

Roland Emetaz was driving from Vancouver to Toledo Washington, in the early morning on May 25. He drove directly into the ashfall, which was combined with a light spring rain.

"It was a little cloudy, just beginning to get light that morning, and I noticed the rain looked a little muddy. [The] rain became muddier and I figured...we were having another eruption. The sky, rather than getting lighter as the morning progressed, got darker. It got darker and darker. It was like the middle of the night. Ahead of me, every once in a while there were big flashes of lightning; but it was the muddy water making the transformers and powerlines short out." (Emetaz Interview)

June 12

Harmonic tremor resumed under Mount St. Helens on June 4. The tremor increased on the twelfth to peak activity and intensity between 7-7:30 p.m. An eruption at 8:45 p.m. sent ash and steam to 50,000 feet, spreading over a 4,500 square-mile area. The eruption ejected cinders and pumice. Battleground, Washington, reported lapilli pumice (one-tenth to two-and-a-half inch diameter rock fragments) falling on the community. Portland received only a dusting of ash; but weather conditions during the week created a health and safety problem, which led to a limited state of emergency. On June 16, the Department of Environmental Quality declared the first "pollution warning" for the city.

### The First Dome

On June 15 the Forest Service's spotter plane confirmed the existence of a lava dome in the volcano's crater. The dome was formed by viscous lava slowly forcing its way up the volcano's vent, cooling as it reached the crater. The dome gave every appearance of being a plug or a cap. USGS geologists, however, noted that such was not the case, that the dome did not lessen the danger of an explosive eruption.

### July 22

The first lava dome was destroyed on July 22 when Mount St. Helens experienced another explosion. USGS and the University of Washington reported that seismic activity prior to July 22 was similar to activity preceding the eruptions of May 25 and June 12, with the exception of the absence of harmonic tremor. Three pulses sent ash to 40-60,000 feet. An evacuation order for Cougar was largely ignored by residents who were becoming acclimated to life in the shadow of an active volcano.

### August 7 and October 16

Explosive eruptions occurred on August 7 and October 16. Both eruptions expelled ash to over 40,000 feet with fallout from the former over eastern Washington, and the latter, to the southwest. On August 8, the Forest Service spotter plane sighted a second lava dome in the crater. It was subsequently destroyed by the eruption of October 16.

### Dome Building Phase

Mount St. Helens entered a new phase following the last of its explosive eruptions on October 16, 1980. The third lava dome appeared in the crater on October 18. It received additional bulk in a series of non-explosive dome building eruptions that began December 27, 1980, and continued periodically throughout 1981.

The dome building eruptions occur, as noted earlier, as lava oozes from the volcano vent onto the floor of the crater. This action has not produced a flow of lava from the crater and has not created any serious danger to the countryside. However, the dome-building eruptions are monitored no less carefully than explosive eruptions. While this phase of eruptions, as well as the post May 18 events, has not approached the magnitude of the May 18 blast, it is an indication that Mount St. Helens has not spent its energy, that it remains a potential hazard. No one is predicting what will happen in the future. This fact makes long range planning on the Gifford Pinchot National Forest, and other non-Federal lands, a precarious, though vital enterprise.

### Closures and Law Enforcement

A closure of the Gifford Pinchot National Forest was much easier to issue than to enforce. Security on and around Mount St. Helens proved no less difficult following the eruption than it had before. The immediate concern of the Forest Service was to keep people in the vicinity of the volcano safe. That task included insuring that the access restrictions were policed and that unlawful entry did not occur.

The May 18 closure was a complete sealing off of the Forest. The logistical problems involved included blockading all major access routes and, of greater difficulty, closing all Forest Service road entrances. Manned roadblocks were, initially, the only method of keeping people out. With the blast on May 18 and the resultant devastation and loss of life, people exhibited less desire to enter the area than only days before. However, by May 23 a Forest Service spokesperson reported pressure from the public for access to the Forest. "All you have to have is a couple days of quiet and people think the danger is gone. It may or may not be." (Columbian, May 23, 1980)

To the credit of the Forest, it acted on the presumption that a danger still existed. Bill Truitt, District Ranger on the Packwood District, recounted an episode in which he was being pressured by local merchants to allow tourist access to the Forest. They were not prepared to listen to his argument that a danger existed. During the meeting, Truitt received word that an eruption was underway. He said demand for an open Forest quickly subsided.

Responsibility for maintaining roadblocks fell to the respective districts. Packwood, a district which was only minimally affected by the May 18 eruption, had 20 roads onto National Forest land that required closing. Packwood employees maintained the roadblocks day and night for approximately one month until gates were erected. Truitt explained:

"We had to have people man those roadblocks 24 hours-a-day. That has...to be one of the worst jobs in the world, especially sitting out there in the middle of the night. It's dark and grey and kind of spooky. The folks didn't enjoy it, and I don't blame them."  
(Truitt Interview)

Besides the gates and roadblocks, roving patrols inspected the areas most likely to invite penetration. The districts again handled the patrols. The personnel hours involved meant that other aspects of district management had to suffer. But this impact was lessened by the total closure that brought to a halt the normal business of the Forest.

Despite the precautions taken to keep individuals out of the restricted areas, violations occurred. Gene Smith, Forest Service representative to the Search and Rescue (SAR) center at Toledo, complained that the SAR operation had spent some valuable time rescuing and administering first aid to zone violators. He recalled there were five such rescues. "There was one reporter rescued and four television people." (Smith Interview)

The closure policy for the Forest evolved in the weeks and months following the eruption. Paul Stenkamp said that after the initial gearing up was complete, his responsibility "was on firming up closures and permits, getting people in that had to be there,...that we had guidelines as to why they should be in there, when they could go in and when they couldn't." (Stenkamp Interview)

On May 21, the Forest closure eased slightly on the Mount Adams District and southern portion of the Wind River District. As the apparent danger subsided, the closures eased and the boundaries rolled back. On June 4, a new order was issued in conjunction with a State of Washington order creating a 20 mile radius red zone around the mountain. Additionally, the Forest Service blue zone followed the lines of the lateral blast hazard within the Forest boundary. Restricted access exemptions included USGS personnel on scientific evaluation and hazard assessment missions, Forest Service personnel acting in support of maintaining security, Federal, State, and local law enforcement personnel, SAR and firefighting crews. A permit system was developed with specific criteria for entrance into the red and blue zones. A committee headed by Dr. John Allen, Portland State University emeritus professor of geology, acted in concert with the USGS and ECC to screen applications for entry by scientists.

Entrants into the red zone were required to meet the following criteria:

1. All permit holders must have two-way radio systems that hook to a base station and must be monitored at all times.
2. Good visibility of the mountain.
3. Entry between the hours 0600-1900 PDT (no overnight occupancy).
4. Have specified routes of travel, mode, and duration.
5. Must not be further than 15 minutes away from a motor vehicle and maintain two-way radio communication with the vehicle or the base station.
6. Planned evacuation procedures and routes.
7. Coordinate their entry with the Director of Emergency Services.

The criteria for entrance into the blue zone were less restrictive, eliminating criteria two and seven above and requiring permit holders to be no more than 30 minutes from a vehicle. (Order-Occupancy and Use, June 4, 1980)

Additional closure notices issued June 11, July 1 and 25, and August 1 modified the June 4 order. The August 1 order opened greater portions of the Forest including removal of all restrictions from the Packwood District. At this writing, permits are still in use.

The restriction of airspace around Mount St. Helens was a complex arrangement involving the FAA and Forest Service, and on May 21, gained the added dimension of the military. The FAA issued airspace restrictions based on information supplied by the Forest Service and USGS. The Forest Service then had a major responsibility to monitor the space. Following the creation of the SAR center at Toledo, the logistical problems increased. During an eight-day period, an average of 45 sorties-per-day were flown out of Toledo, including as many as 102 on May 23. In order to carry out the SAR operation safely and still allow media and scientific flights, a sophisticated communications system was put in the air. The use of a C-130, a communication aircraft of the Air Force, was instituted.

The C-130 monitored all communications for the SAR aircraft and the base at Toledo, and it was able to maintain close internal monitoring of other aircraft in the volcano's vicinity. Simply stated, "you had a military operation working within a Federal Aviation Administration [organization], working then with the Forest on our linkages, tying them to the Toledo [Search and Rescue] base and other search and rescue bases." (Osmond Interview)

The airspace closure varied from day to day depending upon the actions of the volcano and the weather. The initial airspace restriction was a 50-mile radius with a minimum elevation of 50,000 feet. In the month following, the closure zone ebbed and grew, bulged, and elongated. By late June, a basic restriction of ten miles radius and 20,000 feet was in force. On November 1, 1980, the restriction was lifted. The FAA issued a recommendation that aircraft approach no closer than three miles and 3,000 feet and that they fly counterclockwise. Approval to land in the area was to be granted through DES or the Forest Service. Only fifteen planes at one time were allowed into the space, with a hierarchy of priority established. A special radar unit for monitoring the volcano was installed at the FAA's Seattle center. A special radio frequency was put into use. Pilots were admonished under the new regulations to use the "see and be seen" system of safe flying.

#### Search and Rescue

The safety of individuals who might be trapped in the disaster zone was paramount from the moment the volcano erupted. The initial Search and Rescue (SAR) response was undertaken by the separate counties affected by the eruption - Lewis, Cowlitz, and Skamania. The Sheriffs of the various counties have statutory authority for initiating, directing, and conducting SAR missions including operations on National Forest land.

The Sheriffs requested assistance from four air units of the U.S. Army, Washington National Guard, and U.S. Coast Guard on May 18. An agreement allowing for a coordinated effort between the Sheriffs was arranged the following day with air operations established at Yale Reservoir on Tuesday morning, May 20.

A decision in the afternoon of the 20th to reorganize the SAR effort led to an evening meeting at the Cowlitz County Courthouse attended by representatives of the three counties, the Cowlitz County Coroner, the Department of Emergency Services (DES), and the Forest Service. Paul Stenkamp, ECC director, asked Gene Smith of the Gifford Pinchot Timber staff to attend.

Prior to the meeting, the Forest Service role in SAR was primarily intelligence gathering and communications. The districts carried out some initial on-the-ground searches. At the meeting a new SAR organization was created with a division of labor between the Sheriffs and the Forest Service. Cowlitz County took charge of SAR air and ground operations; Lewis County assumed control of base operations and security; Skamania County was to handle the problems surrounding the missing persons issues; and the Forest Service, in conjunction with DES, was given the task of coordinating logistics and liaison with the ECC. Gene Smith was assigned to the operation by Stenkamp. Smith, as a plans chief for forest fires, had experience in arranging resources and communications systems on large fires.

The group determined the Toledo Airport could best serve as the operations center because there was room to set up; it afforded the potential for security; it had available buildings for the morgue, offices, and a command post; it was centrally located for the counties; and, most important, it was located to the west--the safe side of the volcano. Poor weather on May 21 grounded the operation, but allowed a full day to organize the physical layout of the center. (Smith Interview) By Thursday the new operation had flown 46 sorties, and another 102 on Friday. (Mount St. Helens Search and Rescue Plan, 3)

Approximately 190 persons were rescued during the first 36 hours following the eruption and prior to the organization of the SAR operation at Toledo. The SAR team at Toledo set up a systematic grid search of the entire area, retrieved and identified bodies, rescued violators of the closed area, determined names of the missing, and dealt with the media.

The last of these functions posed some especially acute problems for the SAR organization at Toledo. The Sheriffs and the Forest Service hoped for a secure base and a degree of secrecy in order to operate smoothly and without interference. Smith noted an oversight, however: no one told the media they were not allowed at Toledo. "The information was supposed to be handled out of this office [Vancouver] and, therefore, the media was supposed to be here," he explained. "But no one told the media they couldn't go there [Toledo]. So the first morning we showed up, there was the media right out there. It was very difficult to set up with the media swarming all over you." (Smith Interview)

Roland Emetaz, Recreation Manager in the Regional Office in Portland, received orders on May 21 to report to Toledo to act as the Public Information Officer. His responsibilities included disseminating information to the media and keeping the Forest Service, ECC, DES, and the Federal Emergency Management Agency (FEMA) informed of the progress of operations.

Emetaz, apparently, received no initial briefing on the organization of the center or on the problems of media dissatisfaction he was walking into. He had limited PIO experience, but he immediately set up two-per-day briefings with the media and coordinated media tours of the facility and the devastated area. The releasing of certain information placed Emetaz in the "hot seat" more than once. "At times my work was criticized a little bit because I was providing information... approved by the Sheriffs because I felt they were the [people] I was working for." (Emetaz Interview)

When FEMA became involved in disaster relief, it took the position that release of names of the dead and missing should come from the counties. And since Emetaz wore his Forest Service uniform at press conferences and briefings, FEMA thought it appeared the Federal government was interfering in local affairs. Discussions between FEMA and the Forest Service ensued, with FEMA finally agreeing that Emetaz could continue to release the information if he did not wear his uniform. The Forest Service was adamant that he be in uniform. "I was wondering whether I should be stripping in front of the media and the cameras to give the numbers..." (Emetaz Interview) He remained in uniform.

As coordinator of resource plans and logistics, Smith faced numerous problems at Toledo. He together with the Sheriffs had to deal with additional problems that arose at every turn. Smith listed a series of logistical matters which included: handling the media, where to place the morgue, getting enough fuel for the aircraft and ground support, dealing with VIP demands to see the area, rescuing and administering first aid to those who violated the closed area, identifying bodies of the dead, coping with public demands (particularly families of the missing), and arranging for aircraft and base security. Each presented a particular problem.

Additionally, the Sheriffs and Forest Service were not the only agencies at Toledo. The U.S. Army, Washington National Guard, Red Cross, FBI, DES, and several other organizations were represented. A certain amount of interplay occurred. FEMA, which was not represented at Toledo, made its presence felt by interjecting new complications. The Forest Service had been able to procure needed equipment through DES and the National Guard. Once FEMA entered the picture, certain supply requests were routed through the Sixth Army. In one instance, this led to a Pentagon colonel cancelling use of a C-130 communications craft which had been integral to the SAR center control of the airspace over the volcano. FAA air restrictions were in place, but tight control was needed to insure safety at the perimeter, to police violations of the limits, and to monitor the craft that had permits to enter restricted space. Loss of the C-130 made this operation, as well as air-to-ground communications for the actual SAR operation, more difficult.

The Toledo operation received considerable criticism from the media. A careful appraisal of the operation, however, indicates that the criticism was generally without foundation. Public criticism at the seeming lack of speed with which bodies were retrieved was answered by ECC director Paul Stenkamp.

"They didn't go after bodies quite as fast as they did the living and that's only normal. I thought that was right. [The public and the media] didn't understand the logistical problems they were having. Ash was everywhere; foul weather. They took some real serious risks to save people." (Stenkamp Interview)

The Toledo center demobilized May 29. Over 570 sorties were flown during the entire SAR operation (including the period before Toledo was operational). Over 1,000 aircraft hours and 19,760 person hours were involved. (SAR Plan p3) The operation mobilized on June 12 for a short time, but primarily as a test to determine whether the SAR mechanism created May 20 (and refined in the following month) was responsive.

Following the demobilization of the center, the agencies involved joined together to critique the operation. The outcome was the Mount St. Helens Search and Rescue Plan, issued by Clark, Cowlitz, Lewis, and Skamania Counties in June 1980. Ed Osmond, author of the Contingency Plan and liaison officer with the ECC, noted that the Forest Service played an active and unique role in the SAR operation and assisted in the writing of the SAR document. (Osmond Interview)

When asked what should have been done differently at Toledo, Smith cited only two things, both of which later became part of the SAR Plan. First, one of the Sheriffs should have been in charge. He would have handled all the political aspects involved in the operation, allowing the others to work without constant interruption. Secondly, prepared packages for mobilization were needed including a call list, job descriptions, and a series of forms to handle mission reports, victim reports, missing person reports, and debriefing reports for those rescued. (Smith Interview; SAR Plan)

Smith, currently working as Timber staff in the Supervisor's Office in Vancouver, is the Forest Service representative for SAR in the event mobilization is required in the future.

#### Information and Interpretation

Interpretation of the volcano is a form of security which may not at first appear to fall under that category. The Forest Service recognized the attraction of Mount St. Helens to the public, and in order to ensure public safety, a program involving interpretive visitor centers was designed shortly after the May 18 eruption. The Forest Service rightly believed that people would want a closer view of the mountain once the volcano calmed down and initial fears dissipated. The Gifford Pinchot National Forest Supervisor understood this and also recognized that, despite periods of calm, the volcano remained extremely dangerous.

The importance of an interpretive center, in this regard, was underscored by Max Peterson, Chief of the Forest Service, when he testified before the Senate Committee on Appropriations on June 10, 1980:

"One of our important management responsibilities is to provide for public safety of visitors in the Mount St. Helens area. Interpretive programs will compliment law enforcement efforts by explaining the need for limiting access into the area. Limiting access is generally disliked by the public. When the reasons for closures are not understood, people tend to ignore them, causing untold law enforcement problems and avoidable rescue operations."

Peterson continued with other Forest Service concerns that would be met through interpretive programming:

"The human drama associated with the Mount St. Helens area brings additional interpretive needs. Families are concerned with how we are handling sites where friends and relatives died. Through our interpretive programs, we can show some sensitivity and understanding of their needs.

Our immediate plans are to interpret USGS activities by placing their monitoring instruments in our (temporary) mobile visitor centers. In the future, as the activity stabilizes, a USGS observatory could be incorporated into any permanent interpretive facility or facilities." (Senate Hearings, p.148)

Planners estimated that over two million people would visit the area during the year following the eruption. Two Visitor Information Centers were established at Lewis and Clark State Park and another at the Ridgefield exit off I-5. The latter opened July 4 and hosted over 15,000 people during the three-day weekend. The Lewis and Clark Center opened July 12. By the end of the month, approximately 138,000 people had visited the two sites.

Ed Osmond noted that the Forest Service personnel met to determine how best to take the Mount St. Helens story to the public while also keeping the access corridors clear and free of safety problems. The speed with which the package was formulated and in operation was remarkable, according to Osmond. "From the time we said go until the time we were doing it on the ground was... 30 to 45 days." (Osmond Interview) The considerable task of organizing the two mobile centers included purchasing trailers, working out cooperative agreements for use of a site, meeting sanitation requirements, designing exhibits, construction of exhibits, and staffing.

Additional exhibits were put in place at the Gifford Pinchot National Forest Supervisor's Office, District Ranger stations, the Regional Office in Portland, the Zigzag Ranger Station on the Mt. Hood National Forest, and at the Lavalands and Cape Perpetua Visitor Centers.

## Fire Suppression

Approximately 30,000 acres of fires resulted on May 18 from a combination of hot pyroclastic flows and lightning from highly-charged ash clouds. The overall response to the eruption was organized along the lines of a firefighting operation. Ed Osmond noted, "We had a super big fire." He referred to the whole breadth of the crisis, not merely to the fire situation. The entire emergency was unique to Forest Service crisis management, but the type of firefighting it involved was particularly unusual.

As noted previously, Supervisor Bob Tokarczyk was more concerned with the safety of individuals than with extinguishing the fires on the Forest. The volcano continued to erupt into May 19 and precluded any fire response until the ash emissions died down. The fire teams were surprised once they were able to move into the area. Paul Stenkamp recalled that on May 18

"we brought in one [fire] team, but we brought in another Fire Boss and Plans Chief to go with them to get familiar [with the situation], because at that time it looked like we were going to be in a fire problem... We had about 30,000 acres on fire and it was running pretty hot in the early stages on the 18th. But before we got back in to have a good look at what was going on, [the] ash had cooled the fire down. We still had 30,000 acres, but it wasn't going anywhere." (Stenkamp Interview)

The two Class I fire crews on standby were released. The ECC regrouped its fire response with "more of a hot spot initial attack-type hit and run crew" (Theisen Interview). To alleviate the safety problem inherent in fighting fires in the shadow of an active volcano, a system was devised to insure the possibility of immediate evacuation. The ten-member fire crews were airlifted in by helicopter and were required to stay within fifteen minutes of the craft. While this procedure allowed for crew safety, it presented serious difficulties in fighting fires. Fires were not always located where a helicopter could land. That meant that helipads had to be constructed wherever an inaccessible fire was spotted. Even then, the helicopters stirred up so much ash that it was nearly impossible to see. To alleviate that problem, the Plans Chief ordered polybinder, a sealer, to spread on the ash to keep it down. Unfortunately, the eruptions subsequent to May 18 covered the helipads, and several had to be reconstructed. The cost of the Mount St. Helens fires was high.

Theisen noted that if the crews could not get in by helicopter, the fire would not be fought. If safety did not permit a landing, retardant or buckets of water were dropped to control the fires. From mid-July to early August, two retardant drops were averaged per day. By the end of July, over 350 hot spots had been extinguished by a total force of 75 people working out of the Trout Lake Fire Camp.

Bill Truitt, the Packwood District Ranger, spent three weeks as a fire boss beginning in mid-July. He said that the crews were never sure what kind of fire they were up against.

"We didn't really know because the material that was burning was under the ash. And in some cases, it was under two to three feet of ash. We were not certain when we found a hot spot or smoke... whether that smoke was filtering in from... outside and coming at that point or whether that was just one spot [and] all around for fifty acres or so... may have been on fire underneath... The fires we were attacking were individual spots but they were all [perhaps] interconnected by all this mass of blow-down underneath the ash." (Truitt Interview)

Truitt said his charge before becoming the Fire Boss was to be innovative. He was told "you're fighting a fire that is not like any fire you've ever fought." He took the charge to heart and ordered whisk brooms and Christmas tree ornamental bulbs. The former were used to brush ash from logs that had to be cut by chain saws; otherwise the ash would destroy the chains. The bulbs were used in locating hot spots. Helicopters, with infra-red equipment, would find hot spots at night, mapping the general vicinity. During the day, a helicopter crew with a hand-held sensing device would fly the vicinity and find the exact location, then relate the information to the fire crew on the ground. Because the terrain was ash-grey and had no landmarks, the spots were hard to locate. The system devised entailed filling the bulbs with colored chalk and dropping them on the hot spots from the helicopter. According to Truitt, this purchase order was seriously questioned in Vancouver, but the method proved successful.

The Gifford Pinchot National Forest issued a Mount St. Helens Fire Plan on May 14, 1980, designed specifically to address the potential for unusual fire situations in the event of an eruption. According to Theisen and Stenkamp, the original Fire Plan worked as well as could be expected in light of the unpredictable nature of the volcano and the extent and kind of eruption on May 18. Theisen said:

"We had a pretty good plan... prior to the eruption... We had to adjust it after the eruption because some of the things we thought were going to cause some real problems, [like] mudflows on the west side of the mountain, didn't happen... We had to revise the fire plan but basically we used [the original] fire plan..." (Theisen Interview)

Stenkamp said the original Fire Plan did not anticipate how far from the volcano the fire hazard would extend. He noted that the fire crews did not have a chance to test certain parts of the plan because "we never had a magma flow" and "we didn't have as much lightning as we anticipated." He was pleased with the safety phases which were very effective. One of the changes made following the eruption was the development of a new communications system for fighting fires. Prior to the eruption, radio communication was set to operate on the designated ECC channel. During the early stages of the fire response, "we set up another radio channel so that we could have the mountain kind of separate from the other business." (Stenkamp Interview)

The fire problem is under control, but a year-and-a-half after the May 18 eruption, fires continue to smolder under the ash. Truitt noted that fires will smolder under material like ash "for years and years and years." (Truitt Interview)

### Conclusion

The success of the fire fighting effort depended on several factors, all of which can be said to pertain to all other aspects of the emergency response. The Forest Service's flexibility and innovative approach to addressing the disaster created a situation in which the crisis managers were not locked into prescribed actions. The agency could adjust easily and quickly to the changing needs of a particuar situation. As important as that was, the key to the successful response was the depth of the Forest Service crisis organization and the pre-eruption contingency planning.

The structure of the Forest Service fire organization facilitated the acquisition of equipment, supplies, and staff. "There were fire people from other Forests and Regions whom we brought in on detail, much as we would for a big forest fire. We would bring people in for 30 to 60 days, depending on how much time the Forest or Region would let them come." (Stenkamp Interview)

Theisen noted that the service organization which is activated during a fire has expertise in logistical matters. It is able to acquire helicopters at "the drop of a hat." The service organization knows how to cut through channels and clear red tape. "USGS and even, to some extent, the counties... used our... service organization... to find things." Theisen noted that the organization was set up to find everything that could possibly be needed in a crisis: "We had things like [portable] toilets. You would think everybody would know how to get hold of toilets but... they don't... We are used to having them there when the camp is set up." (Theisen Interview)

The eruption extended far beyond the authority of the fire organization. "The way you run a fire, you have a Fire Boss and he is kind of like a god. What he says is the way you do it... [The eruption] was 180 degrees from a normal fire... you just didn't go up and tell a County Sheriff or a County Commissioner, we are going to do this. You had to play politics with him." (Theisen Interview) That, of course, is why the ECC was created. It was recognized early that many jurisdictions would be affected by an eruption. Stenkamp suggested the crisis would have been easier to manage if the mountain had been totally within National Forest land. However, the planning and early role modeling helped smooth out some interplay problems before May 18.

Following May 18, there was an inevitable amount of rangling over cer-  
tain aspects of the crisis management. But it was kept to a minimum,  
generally being worked out both amicably and beneficially between the  
agencies or groups involved. An example was the first meeting between  
the ECC and the Federal Emergency Management Administration (FEMA).  
FEMA came into the picture on May 23 after President Carter declared the  
region a disaster area. FEMA is used to managing emergency situations.  
Its representative met with representatives of ECC and said FEMA was  
taking over the crisis management.

Osmond believes FEMA had the authority to assume control. Yet, he responded that the ECC was in control of the functions it had undertaken, and that it had all the mechanisms in place to handle its end of the crisis. Friction developed on certain levels at that point, but according to Osmond, the relationship between FEMA and ECC improved over the following week. FEMA even took some of the logistical pressure off the ECC by taking over the information dissemination function. Media and public pressure had created real headaches for the information officers of the ECC. Jim Unterwegner, the Gifford Pinchot Public Information Officer, coordinated the information system at the Shilo Motel from late May 18 until FEMA came into the picture. After that, FEMA organized the press conferences for all interested agencies out of its headquarters.

An in-depth review of all the issues and problems in their intricacies and dynamics is beyond the scope of this work. The preceding discussions offer only an indication of the difficulties faced by the Forest Service as it grappled with probably the most complex emergency in its history. Yet, by recounting events and actions still fresh in the memories of the participants, it is possible to grasp how logistical, political, law enforcement, news media, and other such policy questions were dealt with in their most basic terms. In thus clarifying the essentials of the entire process, much light is also shed on the strengths and weaknesses of the system used to manage the 1980 Mount St. Helens volcanic emergency. On the whole, the strengths appear to outweigh the weaknesses.

## EPILOGUE

In the wake of every great disaster people inevitably ask: Could more lives have been saved? Were the warnings timely and sufficient? Were they understood and heeded? The questioning can go on and on, long after the event itself has receded from memory, when answers may be both elusive and even misleading. There is a peculiar--some might say grim--fascination in dissecting human foibles in the face of catastrophe.

The Mount St. Helens volcanic emergency will, no doubt, supply grist in abundance for the mills of those who, armed with the power of hindsight, are inclined to expose the follies of their fellow sojourners in this life. Before May 18, Forest Service personnel were beleaguered with what George Theisen called the "disbelief...that something was going to happen and that some action was necessary." (Theisen Interview) Yet, after the great eruption that Sunday morning, the pendulum swung to the opposite extreme, and the flimsiest rumors--imaginary floods, south side bulges--were embraced without a shred of corroborative evidence. Who could really imagine what did happen? And then, confronted with the unimaginable, nearly anything became suddenly believable.

As catastrophes go, the eruption of Mount St. Helens may have been among those for which possibly the best and most timely warning had been given. As early as 1974, Crandell and Mullineaux had published preliminary indications that studies on both Mount Rainier and St. Helens showed them to be dangerously capable of renewed activity. "If volcanic events similar to the most violent ones of the last 5,000 years at each...occurred today without warning," they wrote in the September-October 1974 issue of USGS's Earthquake Information Bulletin, "thousands of people could be affected." (p.3) Four years later, USGS would publish their detailed findings in the now much-quoted Potential Hazards From Future Eruptions of Mount St. Helens Volcano, Washington (Geological Survey Bulletin 2483-C). Their predictive warning came in a carefully phrased sentence: "The volcano's behavior pattern suggests that the current quiet interval will not last as long as a thousand years; instead, an eruption is more likely to occur within the next hundred years, and perhaps even before the end of this century." (p.C25)

This forecast may have come as a disappointment to those who need their warnings more precisely fixed in time, and it gave no particular indication of what order of magnitude the event might assume. The geologists were, in fact, wrestling with a burdensome dilemma, regardless of what form their warning took. Had they suggested that Mount St. Helens might likely explode as it did--and nothing in its geologic history specifically pointed to this--there would be no way to protect the public against such an alarming prospect, short of widespread and disruptive evacuations. And, certainly, they could make no claims as to exactly when such extreme measures might be needed.

Writing of this dilemma in 1974, Crandell and Mullineaux explained what seemed then the most reasonable course:

"It would be unrealistic to propose to the people and legislature of a state that they should prepare for such [a catastrophic] eruption. For one thing, we do not know which, if any, of the volcanoes will erupt in this manner. We believe that a more credible case can be made for preparing for the kinds of events which have occurred fairly often at a specific volcano, and which, therefore, are likely to occur again. In the event that a catastrophic eruption does begin, the only solution probably will be a mass evacuation of the region." (Crandell and Mullineaux 1974, p.10)

How well their advance warning was understood and heeded will probably be debated at length for many years. All too often, as Theisen put it, "everybody kind of heard the geologists say what they wanted to hear them say." (Theisen Interview) But the record also suggests that those who organized and manned the ECC in the days leading up to May 18, as well as law enforcement people at the State and county levels, deserve real credit for doing everything in their power to translate the geologists' warnings into effective measures to reduce the loss of human life. Property losses in many cases were probably unavoidable, except in instances where foresight prevailed such as Roland Emetaz described:

"Back in the early 60's, we had several proposals for a winter sports site at timberline on Mount St. Helens. I was involved in making some feasibility studies on that. Probably one of the best decisions I ever made was to not develop a winter sports site at timberline, because if we had the facilities there on May 18, they would [have been] completely destroyed..." (Emetaz Interview)

Could the loss of human life have been kept lower or even avoided entirely? Perhaps. Yet, in considering the experience of Kathy Anderson and the tree planting crew, one is reminded that on Mount St. Helens the difference between victims and survivors depended sometimes on utterly unforeseeable, ironic things. Had geologist Dan Miller hinted at the possibility of an eruption next morning, Anderson might have returned to the supposedly safer location of Bean Creek Ridge, thereby adding another 25 persons to the mountain's list of victims. One error thus mercifully cancelled another.

Circumstances also conspired to save lives in other paradoxical ways. Theisen, again reflecting on peoples' ill-advised insistence to gain access to closed areas, illustrated this:

"I think if the mountain [had] taken a year to erupt, I am sure it would have killed a lot more people. I don't think there was any way we could have kept them out. I think the pressure would have been such that it would have been impossible! I think we are lucky that it went in such a short time period--much shorter than geologists thought ..." (Theisen Interview)

And, finally, how far does the public responsibility extend to save people from their own poor judgment? Over a year after the May 18 eruption, Theisen remarked, "I think maybe we are almost to that point where any reasonably prudent person would know the thing is dangerous. How long [do] you owe it to them to protect them?" But then, reconsidering, and in part answering his own query, he summoned up the memory of the photographs of "the kid lying in the back of the truck. He wasn't there by his choice... You have got to think about those kinds of things too."

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CHRONOLOGICAL SUMMARYGeologic Events

- 3/20/80      4.1 earthquake recorded at 3:45 p.m. by the University of Washington.
- 3/22      4.3 earthquake recorded at 3:30 p.m.
- 3/24      Earthquakes of 3.0 or less occur at up to 40 per hour. Some reach 4.4 intensity. Earthquakes described as burps.
- 3/25      Between 2:00 p.m. and 3:00 p.m. eight earthquakes recorded at 4.0 or more. Four mile wide avalanche sighted.
- 3/26      Strongest earthquake to date registers 4.5. Since March 20, thirty earthquakes registered between 3.4 and 4.2 at depth of three miles. Depth considered very shallow.
- 3/27      Eruption reported at 12:45 p.m. Ash plume shoots to 10,000 feet above summit. Hot ash causes northwest flank avalanche. 150 feet deep pit spotted in north portion of original crater.
- 3/28      Earthquakes intensify at depth of less than one mile. Twelve explosions between 3:00 a.m. and 9:30 a.m. send ash to 10,000 feet. Small mudflows observed near Shoestring Glacier. 20 steam vents spotted.
- 3/29      Second crater spotted. Larger crater measures 300 x 450 feet; smaller crater measures 90 x 150 feet.
- 3/30      Six earthquakes register 4.0 or more. Four explosive eruptions occur between 4:00 a.m. and 2:30 p.m. Ash plume reaches 12,500 feet and drifts as far as Bend, Oregon.
- 3/31      Earthquakes reach 4.6 intensity. Five eruptive pulses rock mountain. Two avalanches reported down north flank.
- 4/1      45 minute eruption sends ash to 17,000 feet. Earthquakes decrease in frequency, increase in strength. First harmonic tremor noted at 7:25 p.m. Tiltmeter at Spirit Lake records 1/2 inch ground tilt under the lake.

Geologic Events (Cont'd)

- 4/2/80 Two craters merge creating single 1500 feet wide opening. Twelve eruptive pulses send ash to 16,000 feet. Strongest quake to date registers 4.8. Second harmonic tremor at 8:00 p.m.
- 4/3 Six eruptive pulses send ash to 20,000 feet. Periods of harmonic tremor.
- 4/7 Over last four days harmonic tremor weakens and earthquakes decrease. Mud lakes spotted in crater. Volcano described as "stable."
- 4/8 Five hour eruption occurs. Wishbone Glacier collapses and northwest portion of crater grows. Small eruptions continue through April 22 with ash seldom reaching 1000 feet above crater rim.
- 4/10 "Bulge" on north flank spotted extending 320 feet laterally from mountain. It grows 4-5 feet per day
- 4/22 Volcano enters 16 day non-eruptive stage. Several fumaroles develop near summit.
- 4/24 Swelling occurs on three sides of volcano cone.
- 4/26 USGS reports strong earthquake could trigger collapse of bulge. Between 3/22 and 4/23, 2139 earthquakes of 3.0 or more recorded with 200 over 4.0.
- 4/28 Ground tilt on northeast flank occurring at high rate.
- 4/30 22 earthquakes of 3.0 or more represents lowest seismic activity of the month.
- 5/7 Small eruption ends 16 day period of calm. Eruptive phase continues through May 14. Since March 20, 2550 earthquakes recorded at 3.0 or more with 291 over 4.0.
- 5/8 Strongest earthquake to date registers 5.0. Two periods of harmonic tremor recorded at 4:43 a.m. and 10:05 a.m.
- 5/9 Second 5.0 earthquake recorded.
- 5/12 Several avalanches occur on north flank down both sides of Sugar Bowl and at Goat Rocks.

Geologic Events (Cont'd)

- 5/15/80 Eruptive activity stops through May 17.  
Seismic activity begins three day decline.  
No harmonic tremor recorded.
- 5/18 5.1 earthquake triggers north flank slump  
which releases lateral and vertical blasts.  
150 square miles of vegetation and timber  
flattened. Ash reaches 63,000 feet, blackens  
eastern Washington, Idaho, and western  
Montana. Debris avalanche changes depth,  
elevation, and slope of Spirit Lake. Toutle  
and Cowlitz Rivers drainage flooded. Mount  
St. Helen's elevation drops 1300 feet.  
Pyroclastic flows and lightning ignite 30,000  
acres of fires. Dead and missing eventually  
established at 60.
- 5/19 Eruption continues but lessens in intensity.
- 5/20 Eruption continues with plume at 10,000 feet.
- 5/21 Ash reaches east coast of United States.
- 5/23 Measurements determine crater is one mile  
wide, two miles long with south rim at 8400  
feet and north rim at 5000 feet.
- 5/25 Series of eruptions begin at 2:39 a.m., sends  
ash to 45,000 feet. Visibility zero between  
Kelso and Centralia. Portland receives first  
ash.
- 5/28 Two earthquakes, one over 5.0, hit  
Mt. Margaret. Fear expressed that new  
volcano forming.
- 6/4 Seismic activity ceases. Harmonic tremor  
continues. USGS says volcano is "poised."
- 6/10 Boomerang shaped lake spotted in crater.  
Formed by glacial water trickling down crater  
walls. It is 3/4 mile long and shallow.
- 6/12 Third major eruption with blast at 8:45 p.m.  
sends ash to 50,000 feet. Pumice and ash  
flows of 2-10 meter thickness occurs.
- 6/13 Overnight ashfall hits Portland. Ash falls  
on 4500 square miles.
- 6/15 Lava dome sighted in crater, 200 meters in  
diameter and 40 meters high. No seismic  
activity associated with dome.

Geologic Events (Cont'd)

- 6/18/80 Dome grows 30-45 meters over last two days.
- 6/19 Small earthquake centered near Elk Lake, ten miles north of Mount St. Helens.
- 7/6 Series of earthquakes hit Mount Hood with 55 today tapering to five on July 11. First earthquake at 6:17 p.m. registers 3.2.
- 7/22 Earthquakes reported at Mount St. Helens, similar to pattern prior to eruptions of 3/27 and 5/18, but less intense. No harmonic tremor. Eruption begins at 5:14 p.m., lasts until 7:05 p.m. Ash sent to 50,000 feet. Lava dome destroyed.
- 7/23 Volcanic and seismic activity decreases and remains stable through 8/7.
- 8/7 Seismic activity intensifies in morning. Volcano enters eruptive phase at 4:23 p.m., continues until 11:30 p.m. Ash reaches 44,000 feet, but fallout light.
- 8/8 Second lava dome observed.
- 8/27 Survey line between crater and Spirit Lake has lengthened over two days suggesting relaxing of stresses.
- 9/4 Survey line contracts 2 cm per day. New cracks in ground sighted. Indicates minor outward movement on north side.
- 9/5 Tectonic earthquakes reported northwest of volcano near St. Helens Lake.
- 9/8 Survey line contractions and low SO<sub>2</sub> emission similar to pattern prior to 7/22 and 8/7 eruptions.
- 9/11 Inner crater fractures and deforms as north flank moves outward.
- 9/24 Low level harmonic tremor begins and continues through 9/26.
- 9/28 First earthquake in two weeks registers 2.1.
- 10/16 Earthquakes begin at 7:02 p.m. reaching greatest intensity at 9-9:30 p.m. Eruption at 9:43 p.m. sends heavy ash to 42,000 feet. Lava dome destroyed.

Geologic Events (Cont'd)

- 10/17/80 Eruption continues with pulse at 9:32 a.m.  
sending ash to over 47,000 feet.
- 10/18 Third lava dome sighted.
- 12/27 Dome building eruption lasts through 1/4/81,  
adds lobes to southeast and northwest portions.
- 2/4/81 Non-explosive eruption increases size of  
dome. Seismic activity increases. Dome  
reaches 125 meters high.
- 4/10 Increased seismic activity precedes dome  
building eruption. Dome increases in length  
and width, but not height. "Old" ash falls  
on Randle.
- 6/19 Dome building eruption adds 45 meters to  
height and 40 meters to east-west width.
- 9/6 Minor dome building eruption adds new lobe  
to existing composite dome.
- 10/16 Another dome building eruption similar to  
that on 9/6.

Forest Service/ECC Responses

- 3/20/80 Sharon Buchard at Forest Service Spirit Lake Visitor Center feels earthquake and contacts St. Helens District Ranger Ken Johnson. University of Washington confirms earthquake. Chuck Tonn at Spirit Lake Visitor Center contacts Donal Mullineaux and Dwight "Rocky" Crandall.
- 3/22 Johnson calls Roland Emetaz, Regional Office expert on avalanches, concerning danger.
- 3/23 Emetaz and Ed Osmond fly Mount St. Helens and report only one unusual avalanche - on south flank.
- 3/25 Forest Service closes Mount St. Helens above timberline because of avalanche danger and possible volcanic activity. Forest Service begins preliminary organization for meeting of federal, state, local, and private agencies concerned about Mount St. Helens.
- 3/26 ECC formed at meeting with Forest Service, USGS, DES, County Sheriffs, PP&L, and other agencies. Forest Service takes role of facilitator. Phone linkages established. St. Helens Ranger District develops evacuation plan. Highway 504 closed at Camp Baker to all but Forest Service and media. Forest Service requests FAA closure of air space around volcano.
- 3/27 ECC activated with Paul Stenkamp as director. Gifford Pinchot National Forest Public Information Officer creates information center in Fire Dispatch room of Supervisor's Office. Johnson evacuates Ranger Station at Pine Creek, move to Cougar. Stricter air space closure devised by Forest Service and FAA.
- 3/28 Jim Unterwegner, Gifford Pinchot National Forest PIO, says: "Things are happening by the minute." Three per day news briefings established.
- 3/30 Forest Service air observation reported to cost \$6000-10,000 per day.
- 4/1 ECC coordinates evacuation of logging and contracting equipment from Gifford Pinchot National Forest. St. Helens Ranger District moves property to Cougar.

Forest Service/ECC (cont'd.)

- 4/4/80 Forest Service moves roadblocks 20 miles from volcano to control curious tourists and land-owners from violating closure. Forest Service information moved to Shilo Motel.
- 4/7 Vancouver Columbian praises Forest Service information system.
- 4/8 Forest Service moves roadblocks back toward mountain as danger seems to be decreasing.
- 4/9 Mount St. Helens Contingency Plan approved by Forest Supervisor.
- 4/10 Residents and workers allowed back in area after signing disclaimer developed by ECC.
- 4/11 Forest Service and PP&L sign contract for former's use of PP&L land at Yale Park for mobile interpretive center.
- 4/12 Forest Service exhibit installed at Cougar during past week.
- 4/16 Burlington Northern turns over administration of mountain top to Forest Service. Agreement follows helicopter landing at summit by news crew.
- 4/18 Max Peterson, Forest Service Chief, designates 35,000 acres around mountain as Geologic Area.
- 4/28 Forest Service creates red and black (later blue) zones.
- 5/7 Forest Service announces Spirit Lake may be closed all summer if volcano continues to act up.
- 5/12 Forest Service notes that sightseers are skirting roadblocks to enter restricted zones.
- 5/18 Kathy Anderson of St. Helens Ranger District reports eruption. Forest Service/USGS spotter plane flies at 9:22 a.m. Forest Service begins contacting all ECC members. All Ranger Districts ordered to close entry. Gifford Pinchot National Forest closed by order at 3:45 p.m. Forest Service information moves to Shilo Motel again. Forest Service refuses Gov. Ray's request to fly volcano.

Forest Service/ECC (cont'd.)

- 5/19/80 Forest Service reports \$16.8 million damage to Forest Service property, not counting timber or wildlife.
- 5/21 Search and Rescue Center set up at Toledo Airport. Gene Smith represents Forest Service. Roland Emetaz sent to be PIO in evening. Washington DC Office creates Mount St. Helens situation room.
- 5/22 Max Peterson flies over volcano. Regional Forester announces team of specialists will develop management plan for blast area. Over \$1 billion timber down in Gifford Pinchot National Forest. Tree planting resumes in Colville National Forest's Newport Ranger District for first time since 5/18.
- 5/23 ECC gives information role to FEMA.
- 5/28 PIO at Toledo attacked by Oregonian.
- 5/29 Arvid Ellson of Regional Office named head of management planning team. He is Watershed Management staff.
- 6/1 Mount St. Helens Search and Rescue Plan issued in early June. Revised Mount St. Helens Fire Plan replaces original plan dated 5/14/80. Toledo SAR Center closed.
- 6/4 Forest Service issues stricter, more comprehensive closure policy. Red Zone closure at 20 mile radius. Dwain Tucker of Gifford Pinchot National Forest notes blow-down is twice the annual cut in the Gifford Pinchot National Forest.
- 6/9 Management planning team complete with addition of Bob Lewis, Joe Higgins, and Diana Rodriguez.
- 6/13 Regional Forester notes criticism of closure by public, but answers: "We're not going to put people in there to be killed."
- 6/30 Plans for visitors centers announced by Forest Supervisor, Bob Tokarczyk. Ridgefield Center opens 7/4 and Lewis and Clark Center opens 7/12. Forest Service, FEMA, and DES announce forthcoming brochure on what to do in case of ashfall.

Forest Service/ECC (cont'd.)

- 7/8/80 Okanogan National Forest reports increase in tourism as Gifford Pinchot and Wenatchee National Forests decrease.
- 7/9 Joint damage assessment underway by Forest Service, DES, USGS, and NASA. Lockheed Engineering Services, under Forest Service contract, is doing photo overlays.
- 7/15 Fire camp established at Trout Lake. Surface and underground spot fires total 34,350 acres. Draft of Mount Hood Contingency Plan completed during following week.
- 7/22 Gifford Pinchot National Forest closed south of Highway 12 by new Forest Service order.
- 7/30 350 spot fires extinguished to date.
- 8/4 Forest Service spotter plane sights "glow" in crater.
- 8/18 Forest Service and SCS meet with prospective bidders to discuss reseeding 20,408 acres of state, federal, and private land. 100 attend.
- 8/19 Mount St. Helens Emergency Watershed Rehabilitation Report issued.
- 8/26 Forest Service and SCS announce low bid for reseeding by Wolfkill Seed and Fertilizer Corp. of Monroe, Washington at \$1,469,012.46 for 19,788 acres. Evergreen Helicopter Corp. bid of \$335 per hour for 100 hours is low bid for flying support personnel.
- 8/29 270,000 people through visitor centers to date.
- 9/3 Reseeding begins with first ten days allotted for 8225 acres in Gifford Pinchot National Forest.
- 9/4 Red Zone firefighting placed on standby. Fire crew at Mt. Adams demobilized.
- 9/11 Forest Service operations in Red Zone halted.
- 11/15 Forest Service/USGS issue new hazard update.

Forest Service/ECC (cont'd.)

- 12/22/80 Information dissemination moves from FEMA back to Gifford Pinchot National Forest office.
- 1/26/81 Revised Mount St. Helens Contingency Plan approved.
- 1/30 Draft Environmental Impact Statement: Mount St. Helens Management Plan issued for public comment.
- 2/4 Forest Service closes all Red Zone operations as dome building eruption begins.

Other Agency Responses

- 3/21/80 USGS and University of Washington begin cooperative monitoring of Mount St. Helens.
- 3/23 USGS installs temporary monitoring equipment around volcano.
- 3/24 USGS reports no sign of increased volcanic or thermal activity.
- 3/25 Donal Mullineaux arrives on scene from Denver USGS.
- 3/26 USGS recommends day use only for Forest Service Spirit Lake Visitor Center.
- 3/27 USGS issues hazard alert prior to eruption. Cowlitz County Sheriff establishes roadblock east of Cougar. PPL begins to lower level of Swift Reservoir. FAA restricts air space.
- 3/28 Swift Reservoir reaches 24 feet below capacity.
- 3/30 Cowlitz and Skamania County Sheriffs ask Governor Ray to commit National Guard to help on roadblocks. NASA provides U-2 spotter flights. FAA places tougher restrictions on air space as 70 planes violate previous order. 300 Weyerhaeuser employees evacuated from Camp Baker.
- 3/31 Longview National Guard placed on alert.
- 4/2 U-2 flights dispatched. Gov. Ray forms cabinet level Mount St. Helens Watch Group.
- 4/3 Gov. Ray proclaims state of emergency.
- 4/5 Gov. Ray activates 60 National Guard troops. Guard relieves State Patrol and County deputies at roadblocks.
- 4/14 USGS voices concern that bulge could collapse into Spirit Lake and trigger mud slide and flood in Toutle River Valley.
- 4/17 Eugene Register Guard argues against agencies over reacting, that monitoring instruments show danger from volcano is limited.
- 4/20 State of Washington keeps Swift Reservoir, Merrill Lake, and Spirit Lake closed as fishing season opens. Local merchants report business off by half.

Other Agency Responses (con't.)

- 4/22/80 USGS recommends day use only for cabin owners in Gifford Pinchot National Forest.
- 4/28 USGS says bulge dangerous until it stabilizes. "And the only way it can stabilize is to come down." Sierra Club asks that Mount St. Helens be designated a national park or monument.
- 4/30 USGS issues updated hazard warning based on danger from bulge. Gov. Ray closes State land within ten miles of volcano to loggers, sightseers, and most residents. County Sheriffs on alert to evacuate residents if glaciers begin to fall. Skamania County Sheriff installs two roadblock gates on Highway 504.
- 5/5 University of Washington geologist warns "Something has got to give." USGS reports magma is cause of bulge.
- 5/9 USGS moves monitoring station from timberline area between Spirit Lake and the summit to Coldwater II, six miles north of volcano.
- 5/10 FEMA installs National Warning System (NAWAS) at ECC headquarters in Vancouver. Lines already connected with Cowlitz and Clark County Sheriffs. Skamania County hooked up later in the week.
- 5/16 YMCA and Boy Scout equipment removed from Spirit Lake.
- 5/17 Gov. Ray allows four-hour escorted visit to Spirit Lake by property owners.
- 5/18 Eruption cancels second scheduled visit by property owners. NAWAS not working. FAA changes air space closure several times as conditions warrant. Cougar, Yale, Toutle Valley evacuated. Air Force Reserve and National Guard set up search and rescue at Kelso Airport. County Sheriffs coordinate local search and rescue. I-5 at Toutle River closed.
- 5/19 USGS reports earthquakes much deeper than previous day - 6 to 12 miles, rather than one mile deep.
- 5/20 Debris closes Columbia River through 5/23.

Other Agency Responses (con't.)

- 5/21/80 Gov. Ray asks President Carter to declare region a major disaster area.
- 5/22 President Carter flies over blast zone and declares disaster area.
- 5/23 FEMA establishes Vancouver office and assumes most emergency relief roles.
- 5/24 FEMA begins establishing Disaster Assistance Centers in Washington and Idaho.
- 5/25 Gov. Ray widens state red zone to 20 miles. Yale and Cougar evacuated. Portland International Airport closed.
- 5/26 Search and Rescue officials meet in Toledo to discuss coordination problems between Counties, DES, and National Guard.
- 5/28 Partial list of agencies at FEMA headquarters: USGS and USDA-FS information, DES, EPA, SBA, FBI, IRS, Washington State Patrol, Skamania and Clark Counties, US Air Force, and Center for Disease Control.
- 5/31 USGS reports debris dam at Spirit Lake is stable.
- 6/1 USGS reports old area maps are useless. Vancouver Columbian carries AP story attacking relief coordination.
- 6/3 To date 375 families have applied for temporary housing with 30 housed. Rep. Jim Weaver of Oregon introduces bill to facilitate speedy timber salvage. Congressional Research Service says timber should be written off. Gov. Ray asks out of agreement with Federal government in which State agreed to supply 25% of relief cost.
- 6/4 Gov. Ray establishes stricter State red zone. Secretary of Interior, Cecil Andrus suggests Mount St. Helens should be national monument. President Carter to ask Congress for \$800 million for relief.
- 6/5 Washington Department of Licensing begins issuing permits for entry into red zone.
- 6/7 Scientists report small fir trees and other plants are evident in blast area. Animal tracks sighted.

Other Agency Responses (con't.)

- 6/9/80 House Ways and Means Committee directs U.S. International Trade Commission to conduct a study on the volcano's impact on the Pacific Northwest and the nation.
- 6/10 William Menard of USGS tells Senate Appropriations Committee that Mount St. Helens could trigger other cascade peaks.
- 6/11 Mullineaux warns President Carter that volcano may be ready to erupt again.
- 6/12 Yale and Cougar evacuated. House approves \$783.5 million for relief.
- 6/14 DEQ issues pollution alert for Portland. USGS installs tiltmeters around volcano.
- 6/16 DEQ issues first ever pollution warning in Portland.
- 6/18 Governor Atiyeh asks President Carter to declare Oregon a disaster area.
- 7/6 USGS issues hazard watch to State and local officials around Mt. Hood. Monitoring equipment set up on Hood.
- 7/18 Eleven people convicted of violations of restricted zones.
- 7/28 USGS recommends firefighters stay out of Red Zone because of venting.
- 8/11 USGS reports lava dome could signal end of explosive eruption stage.
- 8/19 Soil Conservation Service reports on Cowlitz and Toutle Rivers damage and rehabilitation needs.
- 8/28 Weyerhaeuser Company issues revised Contingency Plan and Procedures.
- 9/2 National Weather Service issues flood warning for mouth of Toutle River.
- 10/16 Earthquakes at Glacier, Washington, termed normal earth movement by USGS.

Other Agency Responses (con't.)

- 12/22/80 FEMA announces Vancouver office to close at end of year. Information dissemination to move back to Forest Service office in Vancouver.
- 2/4/81 University of Washington predicts dome building eruption.

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